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Serial Number: 09/232,566
Appn. Filed: 01/15/99
Applicant: Rolf Jansen
Appn. Title: Tractor/Trailer Back-up Kit
Examiner/GAU: Tung Vo/2613

Mailed: 08/27/01
At: Houston, Texas

SUBMITTING APPELLANT'S BRIEF

Sir:

Applicant hereby submits Appellant's Brief in triplicate, pertaining to his appeal to the Board of Patent Appeals and Interferences from the Final Office Action that rejected the applicant's two claims. Applicant's check for the fee of \$155.00 (for small business entity) is enclosed.

Applicant also submits Petition to Make Special, with supporting Declaration. Applicant is 68 years of age.

Very respectfully,

Rolf Jansen
Rolf Jansen, applicant, pro se

P. O. Box 73161

Houston, TX 77273-3161

281-440-6907

Certificate of Mailing

I certify that this correspondence will be deposited with the United States Postal Service as first class mail with proper postage affixed in an envelope addressed to "Assistant Commissioner for Patents, Washington, DC 20231" on the date below.

Date: 08/27/01

Rolf Jansen Applicant
Rolf Jansen

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Serial Number: 09/232,566
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APPELLANT'S BRIEF

Appellant, Rolf Jansen, pro se, very respectfully appeals to the Board of Appeals and Interferences from the Final Office Action, rejecting appellant's claims, and will show the Board the following:

I

Summary of Invention

The two claims of the appellant concisely summarize the invention:

An assembly of a camcorder-type liquid crystal display monitor, comprising means for mounting said assembly to the inner retracted side of a driver's sunvisor of a motor vehicle,

whereby said sunvisor, when lowered, allows a driver easy, direct, close-range, sunlight-protected viewing of said monitor screen, as if the screen were a rear-view mirror, when used in conjunction with a video camera, to see to the rear when the unaided view is obstructed.

An assembly of a micro-video, pin-holed lens camera, comprising means for mounting said assembly on the reverse side of a plate, such as a license plate, at the rear of a trailer or motor vehicle, so that said camera can see through a predetermined-sized hole put in said plate, whereby said plate-mounted assembly conceals said pin-holed lens camera to lessen the risk of vandalism, whereby said camera is located in the ideal position at the



2.
rear of a trailer or motor vehicle for viewing a backing,
when used in conjunction with a monitor.

II
Issues

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ENT &
Appellant contests the examiner's conclusions for rejection
of appellant's two claims. Said conclusions are stated below:

"Claim 3 is rejected under 35 U.S.C. 103(a) as being
unpatentable over King (US 5,971,468) in view of Frankhouse,
et al. (US 5,040,120).... Taking the teaching of King and
Frankhouse together as a whole, it would have been obvious to
one of ordinary skill in the art to modify the camera (96) of
Frankhouse into the system of King for the same purpose of
capturing a angle rear view of traffic or objects behind the
vehicle . Doing would allow the driver see a various locations
around the vehicle without turning his/her head around."

"Claim 4 is rejected under 35 U.S.C. 103(a) as being
unpatentable over Abersfelder et al (US 5,646,614).... Taking
the teachings of Abersfelder et al and Aviv together as a
whole, it would have been obvious to one of ordinary skill in
the art to modify the pin hole lens of Aviv into the system
of Abersfelder for the same purpose of seeing through the
predetermined sized hole of license plate."

III
Grouping of Claims

Appellant contends that his two claims do not stand or fall
together, and appellant later in this brief will explain in his
arguments why the claims of the group are separately patentable.



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3.

IV
Arguments

It is important to put two quotes of the examiner, from his Final Detailed Action, next to each other. A copy of the Final Detailed Action is attached as Exhibit 1.

Quoting from page 2, line 10 under heading Claim Rejections -

"Re claim 3, King discloses an assembly of a camcorder-type liquid crystal display monitor (26 of Fig.1) is mounted to the inner retracted side of a driver sunvisor (24 of fig.1) of a vehicle (20 of fig.1) when the sunvisor is lowered allows a driver easily direct, close-range, sunlight-protected viewing of the monitor screen, the display monitor is connected to a navigation system to display a navigation information."

Quoting from page 2, line 1 under heading Response to Arguments:

"Applicant's arguments with respect to claims 3 and 4 have been considered but are moot in view of the new ground(s) of rejection." (Emphasis added.)

The inference that appellant draws from these two statements is that the examiner determined that King and appellant's invention are the same. Such inference is necessary to comprehend why the examiner said all of applicant's arguments were moot, when applicant's first argument was that King was inoperable as prior art because applicant's filing date of his provisional patent application came before the filing date listed for King.

Below, the appellant will show that the examiner erred in making the determination that King and appellant's invention are the same:

A. Examiner erred in stating that the display in King was "a camcorder-type liquid crystal display monitor."

It is common knowledge that a camcorder-type LCD monitor shows motion pictures. In order to determine what the display

of King shows, appellant attaches as Exhibit 2, a copy of King and quotes from the section covering the background of the invention, on page 3, starting at line 1:

"This invention relates to a combined vehicle sunvisor and display panel.

"Vehicles are being supplied with more and more displays to provide information to an operator. As an example, information with regard to the current operating condition of the vehicle, such as speedometer, fuel gauge, oil temperature, etc. have historically been provided to a vehicle operator. More recently, new products such as vehicle navigation systems have provided additional information to the operator.

The increase in the amount of information provided to the operator has resulted in a situation wherein there are many display areas on the instrument panel of the vehicle. Many of these areas are in a location wherein the driver must look away to access the information, such that the driver's attention is not on the road."

In summary, the display in King shows numbers, letters, symbols to replicate data that appears on the dashboard.

Appellant will show that a camcorder-type liquid crystal display monitor is a special type of LCD that evolved from the electronic viewfinder of a video camera, and that it is structurally different from the display of King.

Appellant will show that the term "camcorder-type liquid crystal display monitor" in appellant's claim 3 differentiates appellant's invention from King.

Quoting from the scientific book, Newnes Television and Video Engineer's Pocket Book, Third Edition, by Eugene Trundle, Newnes Publishing, Oxford, 1999 (pages of which are attached as Exhibit 3), on page 148, starting at line 1, under the heading Viewfinder:

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5.

"The camera's electronic viewfinder (EVF) has three main functions and it acts as picture monitor during in-the-field playback in the case of a camcorder...."

Quoting again at lines 26-28, at the bottom of page 148:

"Although physically very small, the components and techniques of the EVF are just the same as are used in the TV receiver and monitors covered in the first half of this book."

Quoting again, at the top of page 149, starting at line 1:

"The fact that colour viewfinders struggle to do justice to the performance of a good video camera has not prevented manufacturers incorporating them in home-movie camcorders! A few models offer the best of both worlds, with a conventional black-and-white VF tube plus a small (4-10 cm diagonal) colour LCD display in a fold out panel on one side of the camcorder body."

Quoting at page 9, titled Chapter 2, TV and Video Waveform and Standards, lines 7-10:

"For moving pictures it is necessary to present a series of frames at a rate which will fool the human eye into believing that it perceives continuous movement; and which avoids noticeable flicker."

Quoting at page 10, lines 12-14:

"Taking the European 625/50 standard as an example, then, the requirement is for the picture to 'light up' 50 times per second to avoid a bad flicker effect." (Emphasis added.)

Quoting from the scientific book, Practical Electronics for Inventors, by Paul Scherz, McGraw-Hill Publishing, New York, 2000, (pages of which are attached as Exhibit 4), at page 515, lines 1-3:

"A number of displays can be interfaced with control logic to display numbers, letters, special characters, and even graphics. Two popular displays that we'll consider here

include the light-emitting diode (LED) display and the liquid-crystal display (LCD)..." (No mention of showing movies.)

Quoting at page 521, lines 10-11, and continuing at page 522, line 1:

"One disadvantage with LCD's is their slow switching speeds (time it takes for a new digit/character to appear) Typical switching speeds for LCD's range from 40 to 100 ms."

The abbreviation for millisecond is ms. One millisecond is 1000th of a second. 40 ms equals 1/25th of a second, which is the fastest speed that a typical LCD display can change to a new digit/character.

The camcorder-type LCD monitor, although very small, uses the components and techniques of a TV receiver. It shows a picture of the content of the whole screen at least 50 times a second, or once in 1/50th of a second.

Showing motion pictures on the display of King would distract the driver from looking at the road. The display of King does not show motion pictures, and it cannot show motion pictures because its internal structure is not built like a TV receiver.

B. The examiner erred in stating that the display in King was a liquid crystal display monitor.

The examiner made this statement in his Final Detailed Action, page 2, line 10 under heading Claim Rejections, said page attached as part of Exhibit 1.

Quoting from the text of King (copy of which is attached as Exhibit 2), page 3, column 2, lines 47-48:

"The display panel is preferably of the reconfigurable type such as LED, LCD, ELD, etc."

Note that King put LCD second in a line behind LED, among three or more choices.

So, it is inaccurate for the examiner to state that the display in King was a liquid crystal display monitor. It is not

necessarily so.

This examiner is pushing too hard to make the appellant's display the same as King.

C. The examiner erred in concluding that appellant's invention was the same invention as King.

This conclusion is inferred by the examiner's statement, noted above, that the display of King was a camcorder-type liquid crystal display monitor.....,

And by the examiner's statement, also noted above, that "Applicant's arguments with respect to claims 3 and 4 have been considered but are moot in view of the new ground(s) of rejection." (Emphasis added.)

Quoting from the text of King, page 3, column 1, line 51:

"The present invention provides information to the operator directly vertically above the operator's line of sight to the traffic. Thus, the operator need only look slightly vertically upwardly. The panel is preferably incorporated into the visor. The information is of the type a driver may reference while driving forwardly, as opposed to backing up." (Emphasis added.)

This quote was from the specification. Now let us look at the claims: From the text of King, page 4, column 2, line 16:

"6. A sunvisor as recited in claim 1, wherein said display panel displays information which a driver will access while driving forwardly." (Emphasis added.)

It is very clear that King's claim pertains only while the vehicle is driving forward, "as opposed to backing up."

Appellant's claims relate only to backing up. So, it would be impossible for appellant's invention to infringe on King. King has staked out the moving forward ground, and expressly showed no interest in the backing of a vehicle, leaving this area open, to whomever wants to deal with backing up only.

It is grossly unjust for this examiner to conclude that appellant's invention is the same as King.

D. Examiner erred in not finding King inoperable as prior art, after appellant gave notice that King's filing date was after appellant's filing date for provisional patent application.

Quoting from applicant's response to the First Office Action, page 3, lines 3-7 (attached as Exhibit 5):

"1. Inoperative Reference: In regard to King, the applicant respectfully submits that this reference is ineffective, because the applicant has an earlier effective filing date, due to his Provisional Patent Application 60/071/830, filed January 20, 1998."

The copy of the patent of King, which is attached as Exhibit 2, shows that the filing date was June 16, 1998.

Attached as Exhibit 6 is copy of the appellant's covering letter for filing of the patent application, and in the covering letter this statement appears:

"Pursuant to 35 U.S.C., 119(e)(i), applicant(s) claim priority of Provisional Patent Application Ser. Nr. 60/071,830, filed 1/20/98."

Attached as Exhibit 7 is copy of the Filing Receipt for appellant's patent application showing filing date of 01/15/99, and a statement on the Filing Receipt is as follows:

"Continuing data as claimed by Applicant - Provisional Application No. 60/071,830, 01/20/98."

E. Examiner erred in his conclusion that, "Taking the teachings of King and Frankhouse together as a whole, it would have been obvious to one of ordinary skill in the art to modify the camera (96) of Frankhouse into the system of King for the same purpose of capturing a angle rear view of traffic or objects behind the vehicle."

1. Quoting from the text of King, page 3, column 2, line 30:

"The information displayed is of the sort which a driver will need to access while driving forwardly. This is contrasted to information only valuable while backing up, such as collision avoidance information. While backing up information displayed on the sunvisor does not assist the operator in not looking away from the driving position." (Emphasis added.)

To whomever wrote this specification, clearly the appellant's invention was not obvious to the responsible parties, Joseph D. King, the inventor, and his "attorney, agent, or firm - Howard & Howard," named in the text of King, page 1.

Here we have a person, or persons, with more than ordinary skill in the art to which said subject matter pertains.

The person filed for an invention of a display mounted on a sunvisor, who had knowledge fresh in his mind about the parameters of his invention, in the same general area as the appellant's invention; and yet this inventor, and his attorney, agent, or firm (all of whom would be professionals) failed to see the appellant's invention of using a sunvisor mounted camcorder-type liquid crystal display monitor to see while backing up.

This is very strong evidence that the appellant's invention is not obvious.

2. Regarding Frankhouse, etal (copy of which is attached as Exhibit 8), their invention consists of an LCD monitor mounted against the interior surface of the roof of a vehicle, on the extreme left side, the extreme right side or in the middle, as opposed to mounting on the driver's sunvisor; and this monitor is shown in Frankhouse drawings (fig.2 and fig.3); and one of the stated uses of this monitor is to see while backing up.

As Fig.3 and Fig.4 show, this mount to the roof of the vehicle is structurally very different from the appellant's sunvisor mount.

3. The appellant's sunvisor-mounted camcorder-type liquid crystal display monitor is an improvement over Frankhouse, et al, because it allows a direct line of vision, as opposed to an angled view.

When backing to a specific point in a narrow passageway for backing, which is common in the trucking industry, the direct, line-of-sight viewing is a useful improvement.

The appellant's back-up kit includes a reversal switch, that reverses the image that the camera sees looking backwards, so that it is as if the driver were looking directly into a rear-view mirror, as he is backing. The appellant's monitor assembly makes it easier for new drivers to learn to back with skill; and there is at present a shortage of skilled truck drivers.

4. In the appellant's invention, when the sunvisor is pulled down, the monitor is completely protected from bright sunlight coming through the windshield. Bright sunlight fades a monitor picture.

Whereas, in Frankhouse, et al, the display does not have protection from sunlight coming in the windshield. Because of the way the corner-mounted display is angled, sunlight will hit its screen and fade the picture, or produce glare. Thereby, appellant's invention is an improvement over Frankhouse, et al.

5. There is a surprising and unexpected advantage of the appellant's sunvisor mount, over the Frankhouse interior roof mount, at the far left, at the far right, or at the middle.

Quoting from Consumer Report magazine, July 2001, in an article comparing LCD flat panel monitors with standard CRT (cathode ray tube) monitor, page 49, column 3, line 10, in square at lower right: (Said reference is attached as Exhibit 9.)

"Unless viewly nearly straight on, flat-panels lose much of their contrast..." (Emphasis added.)

"A CRT's pixels are illuminated differently, producing a softer image viewable from virtually any angle."

Therefore, the appellant's sunvisor-mounted, camcorder-type LCD monitor assembly is a great improvement over the extreme left side, right side, or middle roof-mounted LCD monitor of Frankhouse, because appellant's invention allows line-of-sight, direct view to the back, without lost of picture contrast, ie, fading, which would occur if one is looking at an LCD screen from an angle.

6. The essence of the King invention was that the sunvisor-mounted display allowed the driver to view information (information also appearing on the dashboard to his lower right) pertaining to operation of the vehicle, while keeping his eyes on the road while only looking slightly upward at the sunvisor-mounted display, and not having to look away from the road to view the dashboard to his lower right.

In summary, in King, the driver can look toward the road ahead, not having to look away. The U.S. Patent Office granted King a patent.

In appellant's invention, the driver can look directly ahead and see what is directly behind, not having to look away. The same standard should be applied to the appellant's invention, as was applied in King.

7. If the appellant's sunvisor-mounted, camcorder-type LCD monitor assembly were in fact obvious, because of its advantages noted above, those skilled in the art surely would have implemented it. That is -- the fact that those skilled in the art have not implemented the invention, despite its great advantages, indicates that it is not obvious.

F. Examiner erred in his conclusion that, "Taking the teachings of Abersfelder et al and Aviv together as a whole, it would have been obvious to one of ordinary skill in the art to modify the pin hole lens of Aviv into the system of Abersfelder for the same purpose of seeing through the predetermined sized hole of license plate."

1. License plates already have drilled holes, on the corners, for bolts to pass through. Drilling a hole through the center of a license plate is unusual.

Furthermore, the drilled hole has to be ground down on the back side, to eliminate all traces of rough edges.

For maximum concealment of the micro-video, pinhole lens camera, the camera needs to be glued to the plate, not bolted.

The glue is ideal to set a tight seal between the camera lens housing and the rear of the license plate. But unforeseen problems arise which will make persons think twice before mounting a pinhole lens camera on the back of a license plate.

The glue, or glues, chosen must make a waterproof seal and must hold the seal during extremes of cold and heat. Many glues accomplish one end, but not the other.

Unless one is careful, applying too much glue can spread the glue over the tiny pinhole lens opening, causing havoc.

Glues capable of holding a waterproof seal and of holding during extremes of heat and cold will bond so that the pinhole lens camera can never be removed from the back of the license plate, without damage to the camera.

Although nowadays, states do not issue yearly changes of license plates, and vehicles keep the same plates for years, the consequences of not being able to remove the camera would keep the ordinary person versed in the art from rushing to mount a micro-video, pinholed lens camera on the back of a trailer license plate. This just is not an obvious thing to do.

Only those who appreciate the risk of vandalism of an exotic looking gadget, mounted in plain sight, on the back of a freight trailer, frequently parked unattended in urban, industrial areas, will see that the concealment afforded the plate-mount helps to solve a longstanding problem in the trucking industry -- safe, easy, accurate backing without using a gadget that will attract vandals. And concealment is not easy. The camera must be hidden behind something thin, so the field of view is not overly diminished, and the concealing surface must be something ordinary, like a license plate.

2. A copy of Abersfelder, etal (US 5,940,120) is attached as Exhibit 10.

(a) Its camera system is greatly different in structure and much more complex than the appellant's plate-mounted, pinholed lens micro-video camera.

(b) In order for the camera to swing back and forth in an arc, part of the camera is exposed to anyone's view at the back of the car. The camera is not the pinhole type. Also, the side distance detecting sensors are exposed.

These features are shown in fig.2 (21.1 and 21.2 distance detecting sensors, 20.A and 20.B bounding beams, and 11 camera).

(c) The camera system is designed for an expensive car, like a Mercedes Bens (the car company is the assignee), that normally will be parked at night in a garage, not outdoors in an urban, industrial area where vandalism is a problem.

(d) Appellant's invention has advantages over Abersfelder, in that it is simple, suitable for the trucking industry, and conceals the camera behind the rear license plate of a freight trailer. The license plate is so commonplace that it does not draw attention, and yet the plate is thin enough to allow a wide field of view for the concealed pinhole camera lens.

Nothing else at the back of a freight trailer, at the ideal height/center position has these two requisites.

This ideal height/center position allows the camera a direct view to the loading platform.

This direct, line-of-sight view is especially important when a tractor/trailer rig is backing up to a loading dock that is fairly close to the street. The trailer may be in the driveway, facing south, while the tractor is still in the street facing east, for example. Yet with appellant's invention, the driver can clearly see what is directly behind his trailer, facing south. This is really an astounding improvement.

3. A copy of Aviv (US 5,666,157) is attached as Exhibit 11.

In his Final Detailed Action the examiner referred to column 9, lines 54-65 of Aviv.

(a) Aviv has to do with a pinhole lens camera attached, eg,

to the rear view mirror in the driving compartment of a car, and it takes a picture of a thief in the front seat who is trying to steal the car, and it transmits this picture to police headquarters.

Aviv is a far cry from the appellant's simple invention to conceal a pinholed lens micro-video camera at the back of a freight trailer.

Appellant contends an ordinary person skilled in the art would not think of appellant's invention after being exposed to Aviv and Abersfelder.

4. If the appellant's plate-mounted, pinholed lens micro-video camera assembly, at the back of a freight trailer, were in fact obvious, because of its advantages noted above, those skilled in the art surely would have implemented it. That is -- the fact that those skilled in the art have not implemented the invention, despite its great advantages, indicates that it is not obvious.

All the Exhibits, 1-11, are incorporated by reference into this brief.

In regard to Grouping of claims, noted on page 2 of this brief, explanation is given as follows:

Appellant considers that his two claims are independent claims but that they complement each other.

Each claim provides a phrase that links it to the other claim. To wit: "when used in conjunction with a video camera", and "when used in conjunction with a monitor".

The term Kit in the title of the invention implies more than one component.

The appellant notes that in Abersfelder, et al, attached as Exhibit 10, the one patent covers both a camera at the back of the vehicle and a monitor in the middle console area of the driving compartment.

WHEREFORE, appellant prays that the Board will rule in

appellant's favor, and instruct the examiner to proceed with the issuing of a patent to the appellant, including the two claims fought for by the appellant.

Very respectfully submitted,

Rolf Jansen

Rolf Jansen

Appellant, pro se

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Houston, TX 77273-3161

281-440-6907

Certificate of Mailing

I certify that this correspondence will be deposited with the United States Postal Service as first class mail with proper postage affixed in an envelope addressed to "Assistant Commissioner for Patents, Washington, DC 20231" on the date below.

Date: 08/27/01

Rolf Jansen

Appellant

Rolf Jansen

Appellant's claims are:

3. An assembly of a camcorder-type liquid crystal display monitor, comprising means for mounting said assembly to the inner retracted side of a driver's sunvisor of a motor vehicle,

whereby said sunvisor, when lowered, allows a driver easy, direct, close-range, sunlight-protected viewing of said monitor screen, as if the screen were a rear-view mirror, when used in conjunction with a video camera, to see to the rear when the unaided view is obstructed.

4. An assembly of a micro-video, pin-holed lens camera, comprising means for mounting said assembly on the reverse side of a plate, such as a license plate, at the rear of a trailer or motor vehicle, so that said camera can see through a predetermined-sized hole put in said plate,

whereby said plate-mounted assembly conceals said pin-holed lens camera to lessen the risk of vandalism,

whereby said camera is located in the ideal position at the rear of a trailer or motor vehicle for viewing a backing, when used in conjunction with a monitor.



Office Action Summary

Application No. 09/232,566	Applicant(s) JANSEN, ROLF	
Examiner Tung T. Vo	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 3 and 4 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) 3 and 4 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claims ____ are subject to restriction and/or election requirement.

Application Papers

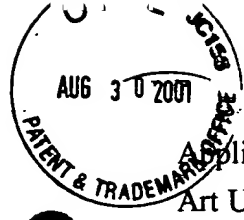
- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____
- 18) ☐ Interview Summary (PTO-413) Paper No(s) ____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____



DETAILED ACTION

Drawings

The corrected or substitute drawings were received on 9/6/00. These drawings are approval.

Response to Arguments

1. Applicant's arguments with respect to claims 3 and 4 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over King (US 5,971,468) in view of Frankhouse et al. (US 5,940,120).

Re claim 3, King discloses an assembly of a camcorder-type liquid crystal display monitor (26 of fig. 1) is mounted to the inner retracted side of a driver sunvisor (24 of fig. 1) of a vehicle (20 of fig. 1) when the sunvisor is lowered allows a driver easily direct, close-range, sunlight-protected viewing of the monitor screen, the display monitor is connected to a navigation system to display a navigation information.

It is noted that King discloses the display monitor is connected to the navigation system but King fails to particularly connect to a video camera to see to the rear when the unaided view

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is obstructed. However, Frankhouse teaches a LCD display (90 of fig. 6) is mounted to the compartment (124 of fig. 6) of the vehicle to display information of a rear view captured by a video camera (96 of fig. 10). Taking the teachings of King and Frankhouse together as a whole, it would have been obvious to one of ordinary skill in the art to modify the camera (96) of Frankhouse into the system of King for the same purpose of capturing a angle rear view of traffic or objects behind the vehicle. Doing would allow the driver see a various locations around vehicle without turning his/her head around.

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aberfelder et al. (US 5,646,614).

Re claim 4, Abersfelder discloses a camera (11 of fig. 1) is built in and located on the back of a car (10 of fig. 1), whereby said camera is located in the ideal at rear of the car for viewing a backing and connected to a monitor (15 of fig. 1), and wide angle lenses are used in this particular camera to receive a wide view image. It is noted that Abersfelder fails to particularly disclose the camera is mounted on the reverse side of a license plate at the rear of vehicle so that the camera can see through a predetermined-sized whole put in the license plate. However, it is well established that one skilled in the art would have obvious to mount the camera anywhere on the car, particularly on the reverse side of a license plate at the rear of the vehicle, and the camera can see through a predetermined-sized hole put in the license plate a rear view when the vehicle is backing.

Abersfelder further teaches any conventional and suitable camera lenses, camera lenses of very compact construction can be used, without the requirement of extending the camera purposes of realizing a sufficient viewing angle (col. 2, lines 16-25). However, Abersfelder does

Art Unit: 2613

not particularly disclose a pin hole lens which is used for a camera. Aviv teaches a pin hole lens is used for a camera (col. 9, lines 54-65). Taking the teachings of Abersfelder et al and Aviv together as a whole, it would have been obvious to one of ordinary skill in the art to modify the pin hole lens of Aviv into the system of Abersfelder for the same purpose of seeing through the predetermined sized hole of license plate.

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Contact Information

Art Unit: 2613


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tung T. Vo whose telephone number is (703) 308-5874. The examiner can normally be reached on M-F 7:30AM-4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris Kelley can be reached on (703) 305-4856. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-6306 for regular communications and (703) 308-6306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

Tung T. Vo
Examiner
Art Unit 2613

T.vo.
January 23, 2001


CHRIS KELLEY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600



US005971468A

20

United States Patent [19]
King

[11] **Patent Number:** **5,971,468**
[45] **Date of Patent:** **Oct. 26, 1999**

[54] **INCORPORATION OF VEHICLE DISPLAY
INTO VEHICLE SUNVISOR**

[75] **Inventor:** **Joseph D. King**, Ann Arbor, Mich.

[73] **Assignee:** **UT Automotive Dearborn, Inc.**,
Dearborn, Mich.

[21] **Appl. No.:** **09/098,084**

[22] **Filed:** **Jun. 16, 1998**

[51] **Int. Cl.⁶** **B60J 3/00**

[52] **U.S. Cl.** **296/97.5**

[58] **Field of Search** **296/97.5**

[56] **References Cited**

U.S. PATENT DOCUMENTS

D. 294,495	3/1988	Nissley	296/97.5
2,547,101	4/1951	Utz	296/97.5
4,875,229	10/1989	Palett et al.	296/97.5
5,320,399	6/1994	White et al.	296/97.5

FOREIGN PATENT DOCUMENTS

406144009	5/1994	Japan	296/97.5
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OTHER PUBLICATIONS

Advertisement for Audiovox Specialized Applications; *LCD Rear Observation System*.

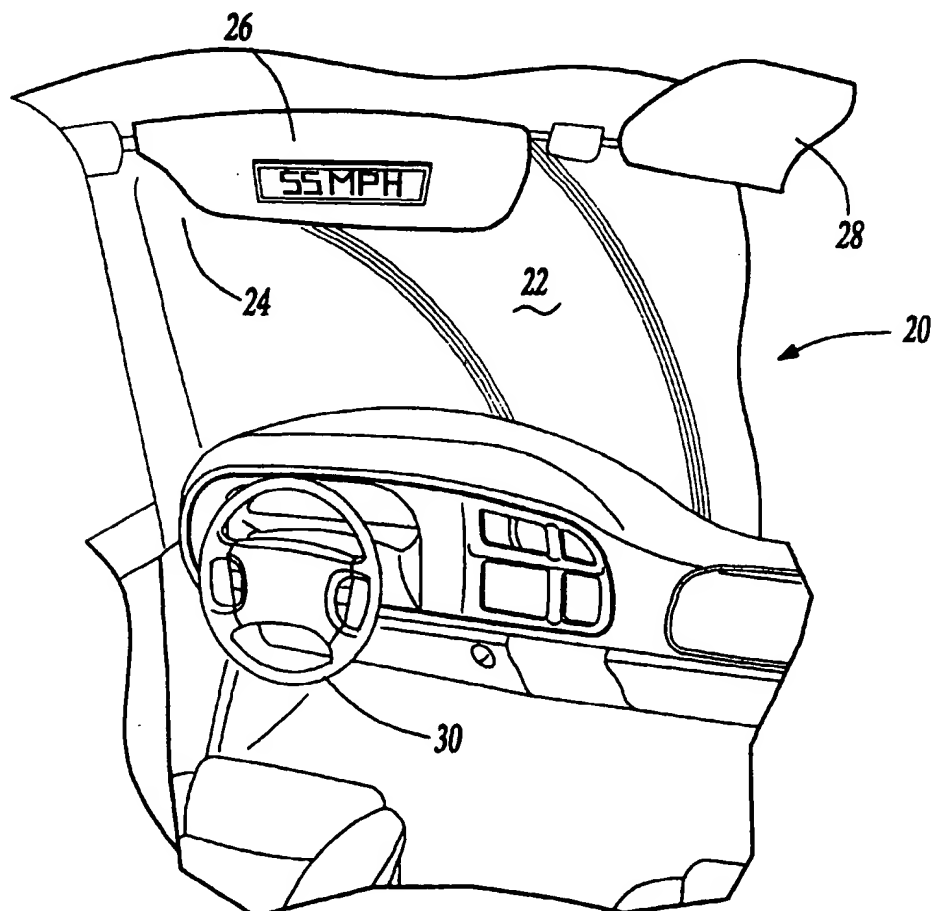
Primary Examiner—Gary C. Hoge

Attorney, Agent, or Firm—Howard & Howard

[57] **ABSTRACT**

A display panel for displaying information to a vehicle operator is placed on a rear surface of a sunvisor for the vehicle. The display panel is hidden when the sunvisor is moved to a stowed position but is easily accessible to the operator when the sunvisor is moved to its extended position. The location of the display panel on the sunvisor allows the operator easy access to the information without diverting information from the road. In addition, control buttons are associated with the display panel such that the operator is able to adjust the information displayed on the panel, or to adjust a component for responding to the information displayed on the panel.

6 Claims, 1 Drawing Sheet



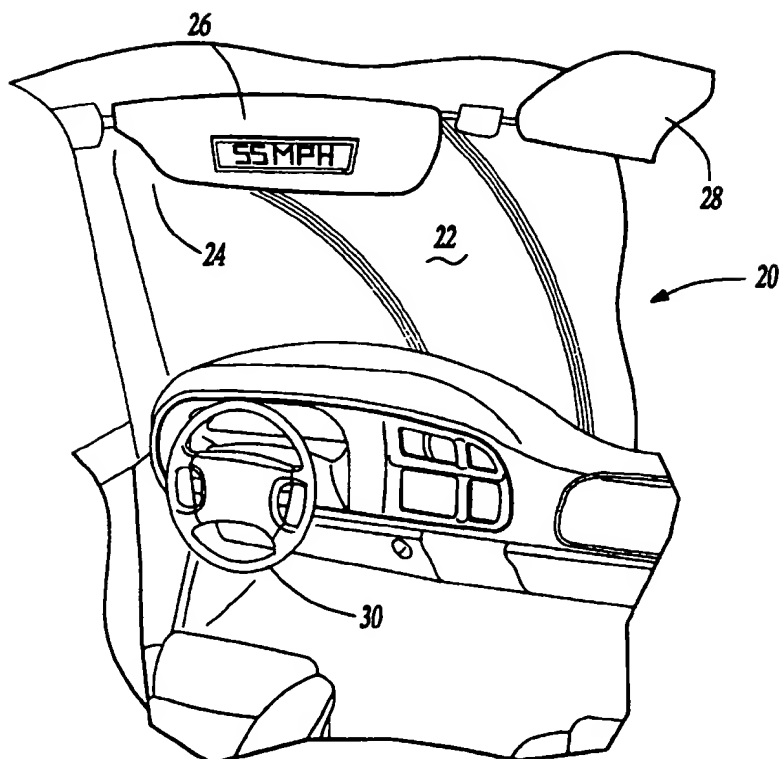


Fig-1

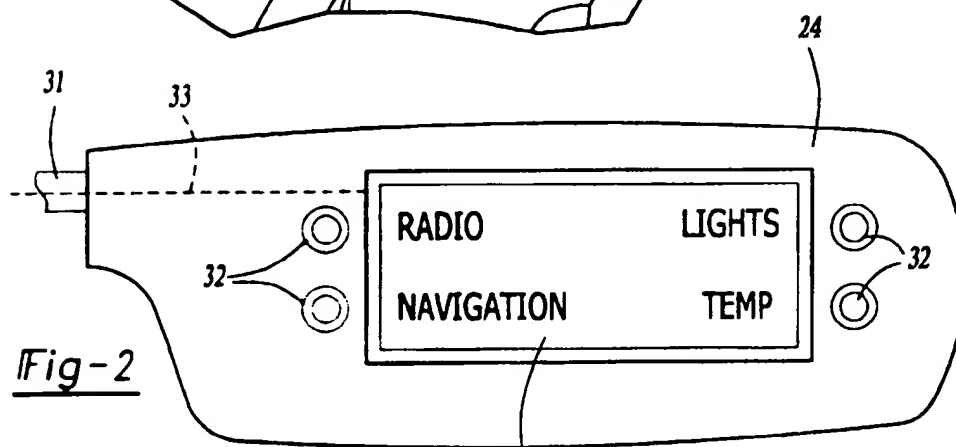


Fig-2

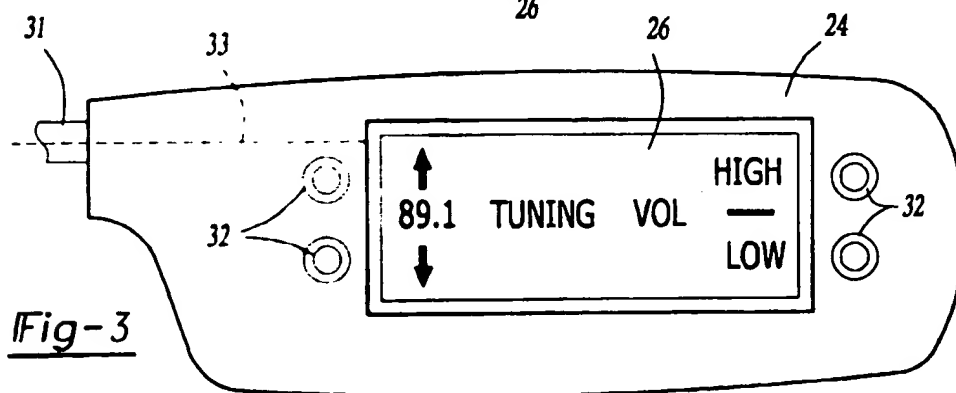


Fig-3

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INCORPORATION OF VEHICLE DISPLAY INTO VEHICLE SUNVISOR

BACKGROUND OF THE INVENTION

This invention relates to a combined vehicle sunvisor and display panel.

Vehicles are being supplied with more and more displays to provide information to an operator. As an example, information with regard to the current operating condition of the vehicle, such as speedometer, fuel gauge, oil temperature, etc. have historically been provided to a vehicle operator. More recently, new products such as vehicle navigation systems have provided additional information to the operator. Further, environmental control systems such as temperature, air conditioning, lights, radio and other entertainment information are also provided to the operator.

The increase in the amount of information provided to the operator has resulted in a situation wherein there are many display areas on the instrument panel of the vehicle. Many of these areas are in a location wherein the driver must look away to access the information, such that the driver's attention is not on the road.

Many of the prior art display panels are in a location where the operator must look away from the road in more than one axes. As an example, many display panels are positioned spaced towards the passenger seat from the driver, and at a vertical location beneath the windshield. Thus, the operator must look vertically downwardly, and to the right to see the information.

Moreover, many of these displays are associated with control buttons to change the state of the information displayed (i.e., radio volume, etc.). Again, if the operator's attention is diverted from the road to control these switches, the results may be undesirable.

It is therefore an object of this invention to provide an information display and associated control that does not remove the operator's line of vision from the road.

SUMMARY OF THE INVENTION

In a disclosed embodiment of this invention, a display panel is positioned on a rear surface of a sunvisor. The sunvisor is of the type which is pivoted downwardly into the driver's view, at a location adjacent the vertically upper end of the windshield. In this way, when the operator wishes to view information on the sunvisor, the sunvisor may be simply pivoted to the down position, and the information is directly in the line of sight of the operator. The operator may only need to look up slightly, and need not look to the side to gain access to the information.

The present invention provides information to the operator directly vertically above the operator's line of sight to the traffic. Thus, the operator need only look slightly vertically upwardly. The panel is preferably incorporated into the visor. The information is of the type a driver may reference while driving forwardly, as opposed to backing up.

In other preferred embodiments of this invention, control buttons to control the information displayed on the display panel are also provided adjacent to the display panel. These controls can also be provided by touch screen menu areas. As an example, the display buttons may be controls to adjust the level of volume for a radio, should the radio be the information displayed on the rear of the sunvisor. The controls necessary for achieving selective control of the information displayed are known. It is the inclusion of the display panel and the controls on the rear of the sunvisor which is the inventive feature of this application.

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These and other features of this invention may be understood from the following specification and drawings, the following of which is a brief description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic view of a vehicle windshield.

FIG. 2 is an enlarged view of a sunvisor incorporated into the FIG. 1 vehicle windshield.

FIG. 3 is a view similar to FIG. 2, but showing a subsequent display.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

A vehicle cab 20 is shown in FIG. 1 incorporating a window glass 22 which shows the road line of sight to the operator. A sunvisor 24 is shown pivoted to a downward position, and a display panel 26 is shown in FIG. 1 on the rear of the sunvisor 24. The display panel 26 is shown displaying speed information, such as typically displayed in the instrument panel. The front of the sunvisor faces outwardly of the vehicle and blocks sunshine into the vehicle.

The sunvisor 28 is pivoted to a stowed position, again as known. Visor 26 may also move to this stowed position.

The location of the steering wheel 30 gives a perspective of the location of the operator's line of sight. The sunvisor display panel 26 is in a location such that the operator need only avert his eyes slightly vertically upwardly to gain access to information displayed on panel 26.

The information displayed is of the sort which a driver will need to access while driving forwardly. This is contrasted to information only valuable while backing up, such as collision avoidance information. While backing up information displayed on the sun visor does not assist the operator in not looking away from the driving direction.

As shown in FIG. 2, the sunvisor 24 incorporates the panel 26. A pivot post 31, which is well known in the art, passes electrical signals to and from the sunvisor. Wires 33 are shown schematically for transmitting this information to and from the display 26 and controls on the vehicle. Typically, the sunvisors have been provided with illuminated lights, but no display panel. Thus, the provision of electrical signals to and from the sunvisor is known. It is the use of the display panel with the signals passing through the pivot post which is unique in this invention. While control buttons 32 are shown, it should be understood that touch screen controls can be used. The display panel is preferably of the reconfigurable type such as LED, LCD, ELD, etc.

Controls, such as buttons 32 allow an operator to select what type of information is displayed, and also adjust variables. As an example, the operator may select from interior comfort options such as radio, lighting temperature, or navigation information. If the driver actuates the radio button as shown in FIG. 2, then the display moves to a radio control display, such as shown in FIG. 3. The operator can manipulate the buttons to select radio information to be displayed. The operator will then be able to adjust aspects of the radio such as volume or tuning. Thus, the operator is able to adjust the radio without diverting his attention from the road other than to look slightly vertically upwardly to the display panel 26. The controls to achieve this adjustment are known, it is the provision of such features into the sunvisor which is inventive. Further, the displays illustrated in the Figures are simplified to allow early understanding of the basic concepts.

The present invention provides an additional area for display which is easily accessible to the operator, without

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diverting attention from the road. The present invention thus is a great improvement upon the prior art. A worker of ordinary skill in the art would recognize that certain modifications come within the scope of this invention. For that reason, the following claims should be studied to determine the true scope and content of this invention. 5

What is claimed is:

1. A vehicle cab comprising

a front windshield, and at least one sunvisor, said sunvisor having a mount structure to be mounted to a roof of said vehicle, said sunvisor being pivotable between a stowed position wherein a first surface faces into said cab, and a second surface faces said ceiling, and said sunvisor being movable to an extended position wherein said second surface faces into said cab and said first surface faces outwardly through said windshield; and 10
a display panel being connected to said second surface, said display panel being connected to a control on said vehicle to display information relative to the operation of at least one component of said vehicle. 15

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2. A vehicle cab as recited in claim 1, wherein said sunvisor is attached to said vehicle by a pivot post, and control wires extending through said pivot post to said display panel.

3. A sunvisor as recited in claim 1, wherein control switches are provided adjacent to said display panel to allow an operator to control information which is displayed on said display panel.

4. A sunvisor as recited in claim 1, wherein said display panel is a reconfigurable display panel.

5. A sunvisor as recited in claim 1, wherein signals wires extending to said display panel pass through a pivot post for said sunvisor.

6. A sunvisor as recited in claim 1, wherein said display panel displays information which a driver will access while driving forwardly.

* * * * *

3

**Newnes
Television
and
Video Engineer's
Pocket Book**

Third edition

Eugene Trundle, TMIIE (elect), MRTS, MISTC



Newnes

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DE

electrical joints, on PCBs and elsewhere, are made with solder. For general purposes is a 60/40 alloy of tin and lead with a melting point around 183°C. For applications where operating temperatures may approach this, high melting point (HMP) solders are available. Solders are generally prepared in wire form with one or more internal cores of non-corrosive flux. For general servicing grades 18 or 22 s.w.g. is suitable, though finer grade (26 s.w.g.) is used for fine work and for rework of SM PCBs. Special-purpose solders also relevant to these are various preforms, and *solder paste*, in which tiny globules of solder are suspended in a semi-liquid flux and dispensed onto the board as required during manufacture or in the latter case from a syringe. All soldering is accompanied by fluxing, the application of an agent (e.g. resin) to remove oxides from the surfaces of both metals to be bonded.

CHAPTER 2

TV AND VIDEO WAVEFORMS AND STANDARDS

'Television' and 'video' are wide-ranging words. For our purposes, television means seeing over long distances by means of an electrical link, and video (in the everyday usage of the word) means a recording and playback system with which TV programmes can be stored on disc or magnetic tape for subsequent replay via a TV set or monitor. In analogue systems the picture information is conveyed as an electrical waveform. Since a single link between TV sender and receiver can only handle one signal at a time, and because a TV picture consists of many hundreds of thousands of individual picture elements, a scanning system is required at each end. At the sending end it breaks down the composite picture into separate picture elements which are then sequentially transmitted. At the receiving end this 'serial' video signal is used to modulate the light output of the display in order to recreate the original scene. Provided that the scanning system at the receiver runs in perfect synchronism with that at the transmitter the positioning of each picture element in the display will be correct, and a complete two-dimensional picture is built up.

The fidelity of the reproduced picture depends on many things. The scanning process consists of analysing the picture in terms of horizontal lines: the duration and number of these lines is the basic arbiter of picture definition and quality. Many other factors are present, such as the bandwidth of the entire video path from camera to picture tube; the screen structure of a colour display tube; the method of encoding the colour signal, and so on.

SCANNING STANDARDS

The number of horizontal scanning lines used in TV picture analysis is a fundamental characteristic of a TV *standard*. So far as line standards are concerned there are now only two in general broadcast use – 525 lines in the Americas, Greenland and Japan, and 625 lines elsewhere, including Eastern and Western Europe, Africa and Australia. More specific details appear later in this chapter. Of course the number of lines only describes how each *stationary* picture is analysed. For moving pictures it is necessary to present a series of frames at a rate which will fool the human eye into believing that it perceives continuous movement; and which avoids noticeable flicker. This depends for its success

on 'persistence of vision', that characteristic of the eye which retains an impression of an image for a fraction of a second after the object itself has disappeared. A series of still images presented at a rate of about 14 per second would provide an illusion of continuous movement, but would give rise to a very distracting flicker. Increasing the rate to 25 per second would reduce the effect but not eliminate it. A repetition rate of 50 per second is satisfactory for most purposes, though 60 is better, especially where the picture is bright. For historical reasons having to do with the frequency of the public electricity supply, 625 line systems generally have a 50 Hz field rate, while 525 line systems have a 60 Hz field rate.

Taking the European 625/50 standard as an example, then, the requirement is for the picture to 'light up' 50 times per second to avoid a bad flicker effect. Since 25 pictures per second are adequate to fulfil the continuous movement requirement, however, it would be wasteful of bandwidth and broadcast spectrum space to transmit 50 complete pictures per second. The problem is neatly solved by the adoption (universal for broadcast TV) of *interlaced* scanning. In this system, instead of transmitting each line of the picture in sequence (Fig. 2.1(a)) the first vertical scanning sweep is done at twice-speed, as it were. The left-to-right scan-line paths are double spaced as a result, and so only $312\frac{1}{2}$ lines (half the total of 625) are traced out, corresponding to lines 1, 2, 3, 4 etc. in Fig. 2.1(b). The second vertical sweep, by virtue of a very precisely timed start point, scans the gaps left between the lines of the first field – lines A, B, C and D in Fig. 2.1(b). By this means, although only 25 complete pictures (*frames*) are presented per second, the entire screen is scanned 50 times (50 *fields*) per second. Since at normal viewing distances individual scanning lines are not perceptible, the effect is to secure a 50 Hz flicker rate while using no more video or spectrum bandwidth than required for a 25 fields/second sequentially scanned system.

THE VIDEO SIGNAL

A standard video signal is an electrical analogy of the brightness of the TV picture at the point on the screen being described at that instant. The brighter the picture-point the higher the voltage, with 'peak-white' – corresponding to maximum drive – being standardised at the level of +1 V. Black is standardised at 0.3 V (300 mV). All the levels of grey therefore fall between these two voltages, and where a lot of detail is present in the scene the video voltage will very quickly alternate between different levels, giving rise to high frequencies in the video waveform. The range of possible frequencies goes from zero

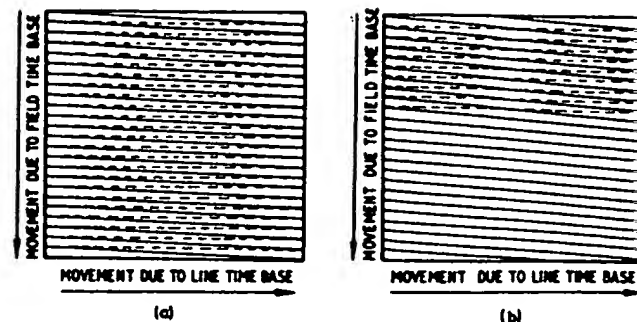


Fig. 2.1 TV scanning: (a) sequential; (b) interlaced

(d.c.) when an even tone (i.e. all black, all grey, all white etc.) is transmitted, up to about 5.5 MHz for a fine network of vertical black and white bars. Three lines of a TV waveform are shown in Fig. 2.3.

Along with the video signal itself synchronising pulses must be sent to keep the scanning at the receiver in step with that in the camera. The 'blacker than black' area between 0 V and 0.3 V is reserved for sync pulses – two types are sent, one at 64 μ s intervals to trigger the line scan generator, and one at 20 ms intervals to synchronise the scanning sweeps. In the receiver these pulses are stripped off the signal by an amplitude limiter (sync separator) and then split into line- and field-rate pulses by frequency (time)-conscious circuitry.

A section of this basic waveform, showing one complete line period of 64 μ s is shown in Fig. 2.3. It is made up of 52 μ s of picture information and a 12 μ s line blanking period. The time-reference point for the whole waveform is the beginning of the 4.7 μ s line pulse. Following the pulse is a 'back porch' period of 5.8 μ s during which the waveform remains at black level. At the finish of picture information comes a 'front porch' of 1.55 μ s. This short blanking

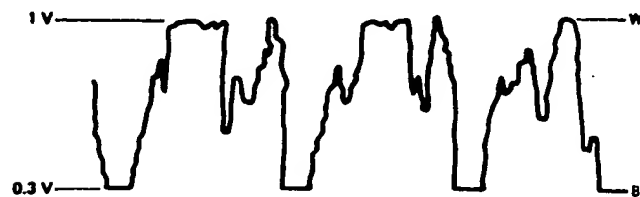


Fig. 2.2 Basic video waveform. The voltage is analogous to the strength of light

and via mirrors. Not all scenes are amenable to auto-focusing; sometimes the main picture feature is not central in the frame, and sometimes a degree of defocusing of some or all of the televised scene is required for production or artistic effects. For these reasons, and to conserve battery power where applicable, the auto-focus facility can be switched off.

The current trend is to use the video signal itself as reference for the auto-focus system as shown in Fig. 6.11. It generally gives more accurate results, and permits a choice of zone sizes for focus sampling.

VIEWFINDERS

The camera's electronic viewfinder (EVF) has three main functions. It frames the shot for the operator and checks optical focus during shooting; it relays information from the camera's system-control section on settings, status and operational mode; and it acts as picture monitor during in-the-field playback in the case of a camcorder. It is difficult to manufacture a very small colour screen with good enough colour fidelity to accurately judge the picture hue, or with sufficient definition to permit accurate optical focusing, especially with high-band and digital cameras.

The norm, then, is a black-and-white viewfinder tube of about 2.5 cm diagonal mounted in a 'chicken-leg' housing hinged at its back end on the top surface of the camera. It has an eyepiece and viewing lens with focus adjustment. The display tube is necessarily a low-energy device with small deflection angle. As in larger picture tubes, magnetic deflection and electrostatic beam-focus systems are used. The VF tube is driven by what amounts to a complete monitor circuit, including video amplifier and output stage; sync separator; time-bases; and high-voltage supplies for the picture-tube, the whole being miniaturised and designed to operate from its own (typically 5 V) supply rail, derived from the camera's own power supply via a stabiliser/regulator circuit. No external controls are needed, though brightness and beam-focus controls may be provided as semi-accessible presets. This complete independence of the EVF system is necessary to enable the viewfinder to perform its role as a video monitor during tape replay when the camera section is switched off. Although physically very small, the components and techniques of the EVF are just the same as are used in the TV receiver and monitors covered in the first half of this book.

Colour EVF

The fact that colour viewfinders struggle to do justice to the performance of a good video camera has not prevented manufacturers incorporating them in home-movie camcorders! A few models offer the best of both worlds, with a conventional black-and-white VF plus a small (4–10 cm diagonal) colour LCD display in a fold-out panel on one side of the camcorder body. In the *Viewcam* the panel of the camcorder consists of a colour LCD panel of 8–10 cm diagonal. While suffering from the above-mentioned shortcomings as a camera viewfinder, it does have the advantages of not needing to be held to the eye while shooting, and of affording more than one viewer (with difficulty!) to watch the playback on location. A new class of camcorder sports a conventional viewfinder housing, but contains a mini-LCD panel in place of the little monochrome panel again with an eyecup and lens. This stretches the cost versus performance of LCD technology tight, and the 'chicken-wire overlay' effect on the VF image can be very obtrusive.

VIEWFINDER INDICATIONS

All feedback to the camcorder operator comes via the few LEDs on the screen, composed and superimposed on the picture by a character-generator IC, which may be incorporated in the main processor. Working on indications sent to the processor from sensors on the tape deck, in the camera section and elsewhere, the character generator provides a wide range of status, indication and warning symbols – plus – very often – a simple titling facility so that captions and titles can be recorded on tape.

CAMCORDERS

Camcorders combine the camera principles described in this chapter with the videorecorder systems described in Chapters 13–19 of this book, and use miniature deck assemblies and (often) small tape drums. They use either low- or high-band formats (see Chapters 13 and 14) and small cassettes of the Video 8 or VHS-C type. Hi-Fi stereo sound, either in f.m. or pulse-code form, is also incorporated in some models. Digital cameras will be dealt with in Chapter 19.

The requirements of small size, light weight and minimum power consumption, together with competition between makers and for the best performance and greatest sophistication, has put camcorders in the forefront of electronic technology. Surface-mount

nable to auto-focusing;
central in the frame, and
all of the televised scene
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Displays

A number of displays can be interfaced with control logic to display numbers, letters, special characters, and even graphics. Two popular displays that we'll consider here include the light-emitting diode (LED) display and the liquid-crystal display (LCD).

I.1 LED Displays

LED displays come in three basic configurations, numeric (numbers), alphanumeric (numbers and letters), and dot matrix forms (see Fig. I.1). Numeric displays consist of 7 LED segments. Each LED segment is given a letter designation, as shown in the figure. 7-segment LED displays are most frequently used to generate numbers (0–9), but they also can be used to display hexadecimal (0–9, A, B, C, D, E, F). The 14-segment, 16-segment, and special 4 × 7 dot matrix displays are alphanumeric, while the 5 × 7 dot matrix display is both alphanumeric and graphic—you can display unique characters and simple graphics.

Various types of displays

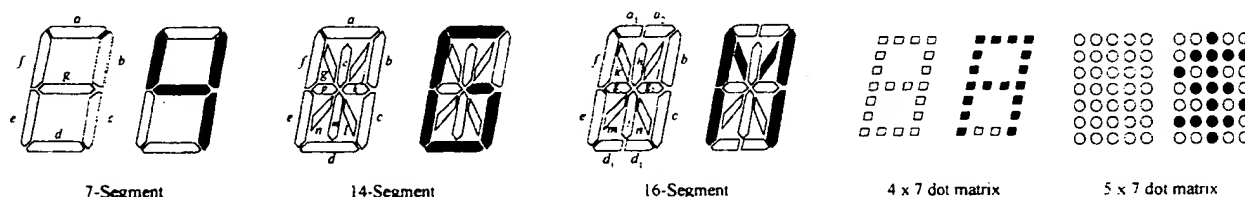
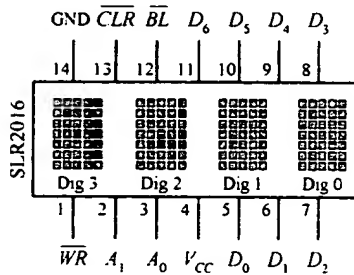


FIGURE I.1

I.1.1 Direct Drive of Numeric LED Displays

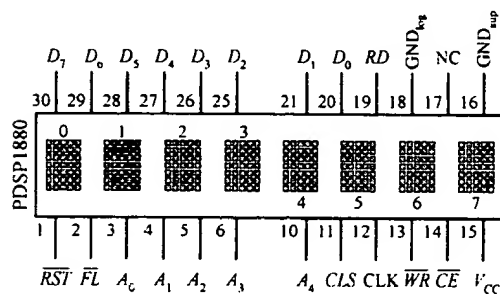
Seven-segment LED displays come in two varieties, common anode and common cathode. Figure I.2 shows single digital 8-segment (7 digit segments + decimal point) displays of both varieties.

SLR2016 (Siemens) 4-Digit 5 x 7 Dot Matrix
Alphanumeric Intelligent Display

SLR2016 Character Set

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80																				

PDSP1880 (Siemens) 8-Character 5 x 7 Dot Matrix Alphanumeric Programmable Display



PDSP1880 Character Set

[illegible]

FIGURE 1.9

1.3 Liquid-Crystal Displays

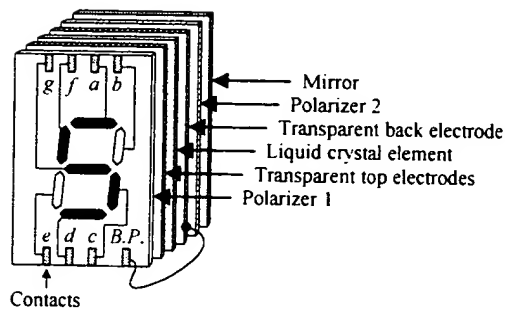
In low-power CMOS digital systems (e.g., battery- or solar-powered electronic devices), the dissipation of an LED display can consume most of a system's power requirements, something you want to avoid, especially since you are looking to save power when using CMOSs anyway. Liquid-crystal displays (LCDs), on the other hand, are ideal for low-power applications. Unlike a LED display, an LCD is a passive device. This means that instead of using electric current to generate light, it uses light that is already externally present (e.g., sunlight, room lighting). For the LCD's optical effects to occur, the external light source need only supply a minute amount of power (within the mW/cm^2 range).

One disadvantage with LCDs is their slow switching speeds (time it takes for a new digit/character to appear). Typical switching speeds for LCDs range from

around 40 to 100 ms. At low temperature, the switching speeds get even worse. Another problem with LCDs is the requirement that external light be present. Though there are LCD displays that come with backlighting (e.g., LED behind the display), the backlighting alone tends to defeat attempts at keeping power consumption to a minimum.

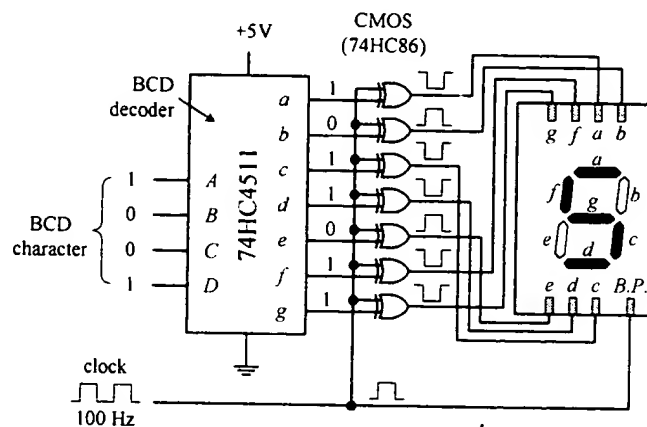
1.3.1 Basic Explanation of How an LCD Display Works

An LCD display consists of a number layers that include a polarizer, a set of transparent electrodes, a liquid-crystal element, a transparent back electrode, a second polarizer, and a mirror. See leftmost figure below.



Cutaway view of a reflective-type LCD

FIGURE I.10



Example circuit showing how to drive LCD

The transparent top electrodes are used to generate the individual segments of a digit, character, etc., while the transparent back electrode forms a common plane, often referred to as the *back plane* (BP). The top electrode segments and the back electrode are wired to external contacts. With no potential difference between a given top electrode and the back electrode, the region where the top electrode is located appears silver in color against a silver background. However, when a potential is applied between a given top electrode and back electrode, the region where the top electrode is located appears dark against a silver background.

The circuit in Fig. I.10 shows a simple way to drive a 7-segment LCD. It uses a 74HC4511 BCD decoder and XOR gates to generate the prior drive signals for the LCD. A very important thing to note in this circuit is the clock. As it turns out, an LCD actually requires ac drive signals (e.g., squarewaves) instead of dc drive signals. If dc were used, the primary component of the display, namely, the liquid crystal, would undergo electrochemical degradation (more on the liquid crystal in a moment). The optimal frequency of the applied ac drive signal is typically from around 25 Hz to a couple hundred hertz. Now that we understand that, it is easy to see why we need the XOR gates. As the clock delivers squarewaves to the back electrode (back plane, or BP), the XOR gates act as enable gates that pass and invert a signal and apply it to a given top electrode segment. For example, if a

ABOUT THE AUTHOR

Paul Scherz is a physicist/mechanical engineer who received his B.S. in physics from the University of Wisconsin. His area of interest in physics currently focuses on elementary particle interactions, or high-energy physics, and he is working on a new theory on the photon problems with Nikolas Kauer (Ph.D. in high-energy physics, Munich, Germany). Paul is an inventor/hobbyist in electronics, an area he grew to appreciate through his experience at the University's Department of Nuclear Engineering and Engineering Physics and the Department of Plasma Physics.

5

In the United States Patent and Trademark Office

Serial Number: 09/232,566
Appn. Filed: 01/15/99
Applicant(s): Rolf Jansen
Appn. Title: Tractor/Trailer Back-up Kit
Examiner/GAU: Tung Vo, Group Art Unit 2713

Mailed: January 2, 2001
At: Houston, TX

Amendment A

Assistant Commissioner for Patents
Washington, District of Columbia 20231

Sir:

In response to the Office Letter mailed August 2, 2000, please amend the above application as follows:

Claims: Cancel all claims of record and substitute new claims 3 and 4 as follows:

3. An assembly of a camcorder-type liquid crystal display monitor, comprising means for mounting said assembly to the inner retracted side of a driver's sunvisor of a motor vehicle,
whereby said sunvisor, when lowered, allows a driver easy, direct, close-range, sunlight-protected viewing of said monitor screen, as if the screen were a rear-view mirror, when used in conjunction with a video camera, to see to the rear when the unaided view is obstructed.
4. An assembly of a micro-video, pin-holed lens camera, comprising means for mounting said assembly on the reverse side of a plate, such as a license plate, at the rear of a trailer or motor vehicle, so that said camera can see through a predetermined-sized hole put in said plate,
whereby said plate-mounted assembly conceals said pin-holed lens camera to lessen the risk of vandalism,

whereby said camera is located in the ideal position at the rear of a trailer or motor vehicle for viewing a backing, when used in conjunction with a monitor.

REMARKS

Applicant wishes to thank the Examiner for sending the copies of the references.

Applicant submitted corrected drawings NO. 1-5 that were received in the Patent Office on August 30, 2000.

Applicant filed a Petition for Extension of Time (2 months) that was received in the Patent Office on October 17, 2000.

Applicant has rewritten all claims to define the invention more particularly and distinctly so as to overcome the technical rejections and define the invention patentably over the prior art.

Claims objections: Applicant has made the appropriate correction, in Claim 2, line 1, to change "enclosure for" to "assembly of".

Applicant changed also the wording of Claim 1, in order to use the better term "assembly of".

Summary of Claims Rejection

Claims 1 and 2 were rejected under U.S.C. 103(a) as being unpatentable over Yang (US 5,615,023) in view of King (US 5,971,468).

Response Regarding Claim 1

1. Inoperative Reference: In regard to King, the applicant respectfully submits that this reference is ineffective, because the applicant has an earlier effective filing date, due to his Provisional Patent Application 60/071/830, filed January 20, 1998.
2. Unsuggested Combination: The prior-art references (King and Yang) do not contain any suggestion (express or implied) that they be combined, or that they be combined in the manner suggested.
3. Solved Different Problem: Applicant's invention solves a different problem than the reference (King), and such different problem is recited in the claims. In re Wright, 6 USPQ 2d 1959 (1988).

Applicant's sunvisor-mounted display is a video display capable of showing moving pictures of the scene outside and behind the trailer.

The King display provides information that is ordinarily found on the instrument panel of the vehicle, in the various gauges, showing the operating condition of the vehicle.
4. New Principle of Operation: The invention utilizes a new principle of operation. Applicant has blazed a new trail, rather than followed one.

Yang claims a display comprising a hologram optical system and a holographic combiner.

Applicant's display has nothing whatsoever to do with the principle of a hologram. Applicant's display is based on

the principle of the camcorder-type liquid crystal display monitor, that is small and thin and capable of being mounted on a sunvisor.

5. Made Simpler: A prior-art version has been made simpler without loss of capability.

Applicant's display, using a camcorder-type LCD monitor, is much more simple, and presumably much more cost effective, than the complex holographic display of Yang.

Applicant's sunvisor-mounted display is a novel improvement over the complex holographic display of Yang; and the advantages are stated in applicant's claim:

"...whereby said sunvisor, when lowered, allows a driver easy, direct, close-range, sunlight-protected viewing of said monitor screen, as if the screen were a rear-view mirror, when used in conjunction with a video camera, to see to the rear when the unaided view is obstructed."

6. Lack of Implementation: If applicant's sunvisor-mounted video display were in fact obvious, because of its advantages noted above, those skilled in the art surely would have implemented it by now. That is -- the fact that those skilled in the art have not implemented the invention, despite its great advantages, indicates that it is not obvious.

Therefore, applicant submits that Claim 1 is allowable over cited references and solicits reconsideration and allowance in its rewritten form as Claim 3.

Response Regarding Claim 2

1. Background To The Legal Arguments Which Will Follow:

The main attribute of the applicant's plate-mounted assembly (micro-video, pin-holed lens camera) is that it is hidden from view, and this lessens the risk of vandalism.

The claim as originally stated: "... whereby said mounted enclosure conceals the pin-hole camera to lessen the risk of vandalism..." The claim as amended now states: "... whereby said plate-mounted assembly conceals said pin-holed lens camera to lessen the risk of vandalism..."

The assembly needs to be placed behind something that is thin and inconspicuous, for example, a license plate, with a tiny hole drilled through it, so that the pin-holed lens of the micro-video camera can see through.

The plate must be thin so that the field of view of the lens is not substantially reduced in size. A wide-angle field of view is advantageous while backing.

Affixing the back of the metal plate directly against the metal lens housing creates a problem: In winter conditions the coldness of the metal plate passes to the metal lens housing and then to the interior circuit board, causing the camera to become inoperative. In summer conditions, excessive heat passes through to the interior of the camera.

Therefore, the clear plastic pane in the applicant's assembly insulates, and also protects from moisture, dust, and scratches.

The plastic pane is necessary in order for the assembly to be mounted on the back side of the plate in a manner that is effective in all weather conditions.

But the main reason for the plate-mounted assembly is to hide the camera from view to lessen the risk of vandalism, yet to allow the camera to be positioned low enough to have a direct view of a loading platform, or dock.

A video camera assembly positioned low, at the back of a freight trailer, and not hidden from view, is exotic and will attract attention.

In Houston, Texas, for example, many freight trailers are parked in lots next to the Houston Ship Channel. This is an industrial section of the city. Street gangs of youth are common in this area.

Those conditions are certainly not limited to Houston, Texas. Gangs are common in urban, industrial sections. Tractor/trailer rigs naturally gravitate to industrial sections.

A video camera assembly positioned low but not hidden from view is at risk of being vandalized -- damaged or stolen.

The applicant's plate-mounted assembly is a novel improvement over an assembly that is positioned low but not hidden from view.

2. Unrecognized Problem: The problem solved by the invention

was never before even recognized. The recognition of an unrecognized problem militates in favor of patentability.

Yang does not address the risk of vandalism at all.

3. Lack of Implementation: If applicant's plate-mounted assembly were in fact obvious, because of its advantages, those skilled in the art surely would have implemented it by now. That is -- the fact that those skilled in the art have not implemented the applicant's plate-mounted assembly, despite its great advantage, indicates that it is not obvious.
4. As stated earlier in this Response, the plastic pane is necessary in order for the assembly to be mounted on the back side of the plate in a manner that is effective in all weather conditions. But it is the plate-mount itself that is the heart of the invention (Claim 2). Therefore, the applicant decided to delete mention of the pane in the amended claim (Claim 4).

Therefore, for the reasons stated above, applicant submits that Claim 2 is allowable over the cited reference and solicits reconsideration and allowance in its amended form, as Claim 4.

Conclusion

For all of the above reasons, applicant submits that the claims are now in proper form, and that the claims all define patentably over the prior art. Therefore, he submits that this application is now in condition for allowance, which action he respectfully solicits.

Conditional Request For Constructive Assistance

Applicant has amended the claims of this application so that they are proper, definite, and define novel structure which is also unobvious. If, for any reason this application is not believed to be in full condition for allowance, applicant respectfully requests the constructive assistance and suggestions of the Examiner pursuant to M.P.E.P.706.03(d) and 707.07(j) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Very respectfully,

Rolf Jansen

Rolf Jansen, Applicant Pro Se
P.O. Box 73161
Houston, TX 77273-3161
Tel. 281-440-6907

Certificate of Mailing: I certify that on the date below this document and referenced attachments, if any, will be deposited with the U.S. Postal Service as first class mail in an envelope addressed to: "BOX NON-FEE AMENDMENTS, ASSISTANT COMMISSIONER FOR PATENTS, WASHINGTON, DC 20231."

January 2, 2001

Rolf Jansen

Rolf Jansen, Applicant

In the United States Patent and Trademark Office

Mailed 199 9, Jan, 15

Box Patent Application
Assistant Commissioner for Patents
Washington, District of Columbia 20231

Sir:

Please file the following enclosed patent application papers:

Applicant #1, Name: Rolf Jansen

Applicant #2, Name: _____

Title: Tractor/Trailer Back-up Kit

☒ Specification, Claims, and Abstract: Nr. of Sheets 39

☒ Declaration: Date Signed: JAN. 15, 1999

☒ Drawing(s): Nr. of Sheets Enc.: Formal: 5 Informal: _____

☒ Small Entity Declaration of Inventor(s) ☒ SED of Non-Inventor / Assignee / Licensee

☐ Assignment enclosed with cover sheet and recordal fee; please record and return.

☒ Check for \$ 395.00 for:

☒ \$ 395.00 for filing fee (not more than three independent claims and twenty total claims are presented).

☐ \$ _____ additional if Assignment is enclosed for recordal.

☐ Disclosure Document Program reference letter.

☒ Pursuant to 35 U.S.C. §119(e)(i), applicant(s) claim priority of Provisional Patent Application Ser. Nr. 60/071,830
filed 1/20/98

☒ Return Receipt Postcard Addressed to Applicant #1.

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Very respectfully,

Rolf Jansen
Applicant #1 Signature

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Applicant(s)

ROLF JANSEN, HOUSTON, TX.

CONTINUING DATA AS CLAIMED BY APPLICANT-

PROVISIONAL APPLICATION NO. 60/071,830 01/20/98

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TITLE

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(see reverse)



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Frankhouse et al.

[11] Patent Number: 5,940,120

[45] Date of Patent: Aug. 17, 1999

[54] VANITY CONSOLE

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[21] Appl. No.: 08/545,947

[22] Filed: Oct. 20, 1995

[51] Int. Cl.⁶ H04N 7/18

[52] U.S. Cl. 348/61; 348/148

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348/794, 115, 148; 33/356; 362/83.1, 144,
2, 30; 606/11; 340/475, 148; 396/2; 345/7,
9; 296/37.7; 29/863; 356/141.1

[56] References Cited

U.S. PATENT DOCUMENTS

2,492,224	12/1949	Kaplan et al. .	
2,515,437	7/1950	Bisch et al. .	
3,591,792	7/1971	Soltan	362/144
4,443,819	4/1984	Funada et al. .	348/794
4,477,184	10/1984	Endo	356/141.1
4,499,451	2/1985	Suzuki et al. .	362/83.1
4,503,854	3/1985	Jako	606/11
4,546,551	10/1985	Franks	33/356
4,558,899	12/1985	Cju	296/97.8
4,591,987	5/1986	Brown	348/140
4,630,904	12/1986	Pastore .	
4,672,435	6/1987	Gluck	348/44
4,738,481	4/1988	Watjer et al. .	296/37.8
4,824,159	4/1989	Fluharty et al. .	296/37.7
4,893,867	1/1990	Hilborn et al. .	296/214
4,910,591	3/1990	Petrosian et al. .	348/148

4,988,140	1/1991	Van Order .	
5,014,167	5/1991	Roberts	362/83.1
5,037,182	8/1991	Groves et al. .	
5,039,153	8/1991	Lindberg et al. .	296/37.7
5,072,246	12/1991	Thayer et al. .	396/2
5,121,200	6/1992	Choi	348/148
5,148,283	9/1992	Taddeo .	
5,164,827	11/1992	Paff	348/143
5,182,675	1/1993	Arbisi et al. .	
5,207,492	5/1993	Roberts	362/30
5,289,321	2/1994	Secor	359/896
5,303,205	4/1994	Gauthier	367/108
5,309,634	5/1994	Van Order	29/863
5,355,284	10/1994	Roberts .	
5,361,190	11/1994	Roberts et al. .	
5,548,492	8/1996	Hansen	362/83.1
5,575,552	11/1996	Faloon et al. .	362/83.1
5,741,966	4/1998	Handfield	73/146.5

Primary Examiner—Bryan Tung

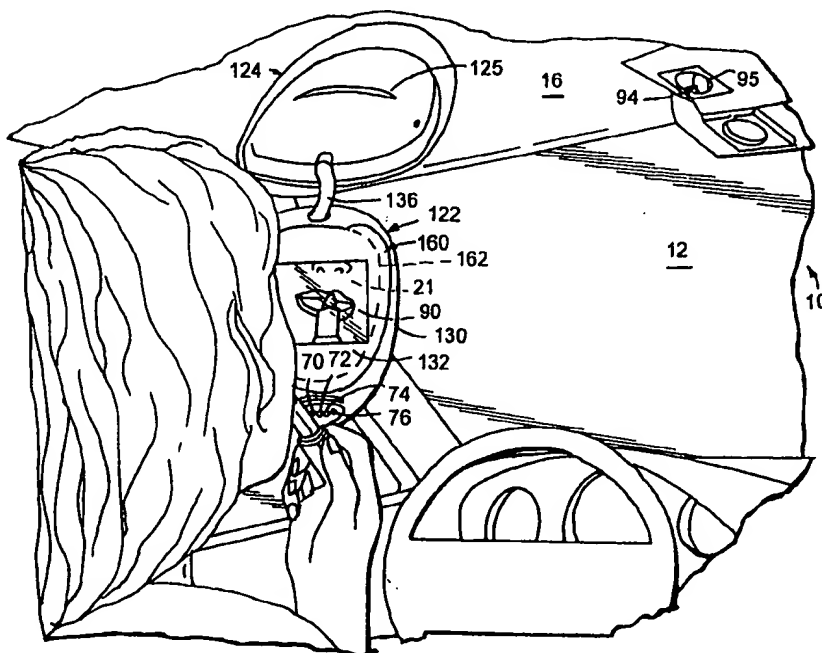
Attorney, Agent, or Firm—Price, Heneveld, Cooper, DeWitt
& Litton

[57]

ABSTRACT

A vanity console is provided with a housing having a mirror mounted therein made of a material providing both reflectivity and transmissivity characteristics. A source of illumination such as a peripheral fluorescent tube extends behind the outer periphery of the mirror and directs light through the two-way mirror for use of the vanity mirror in low ambient light conditions. The mirror preferably is shaped to conform to the shape of a user's face. In one embodiment of the invention, positioned centrally behind the mirror is a video image source, such as an LCD display, which is supplied with video information from a variety of sources such as vehicle mounted cameras that the vanity console can serve the function of video imaging as well.

12 Claims, 7 Drawing Sheets



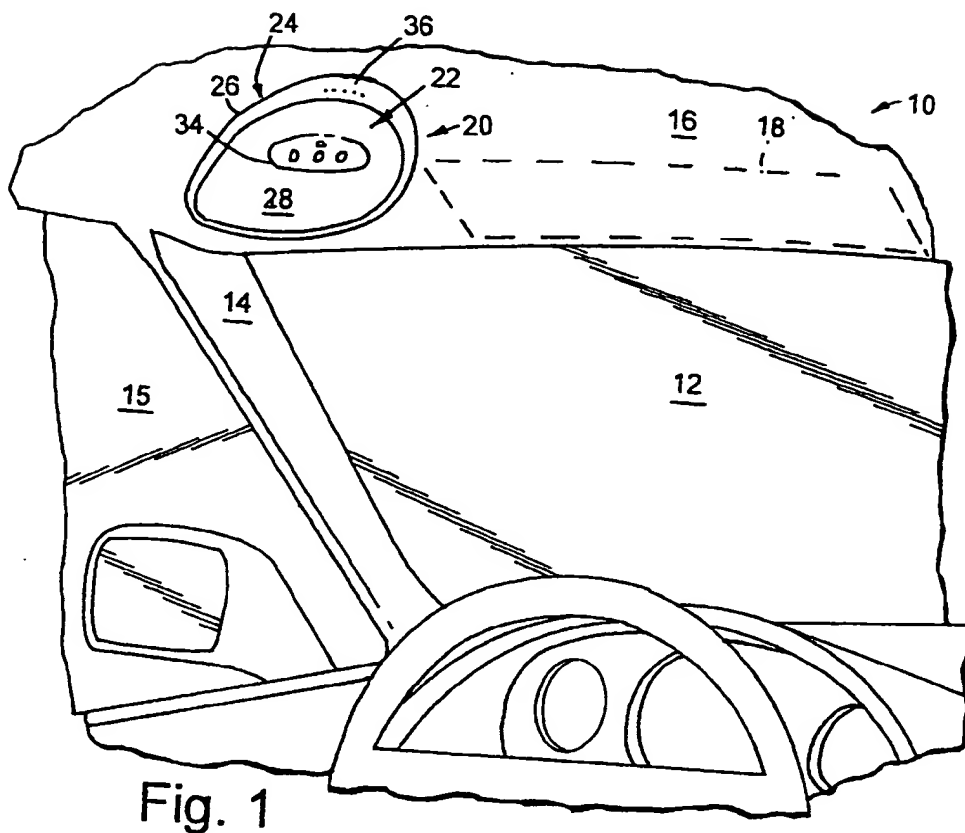
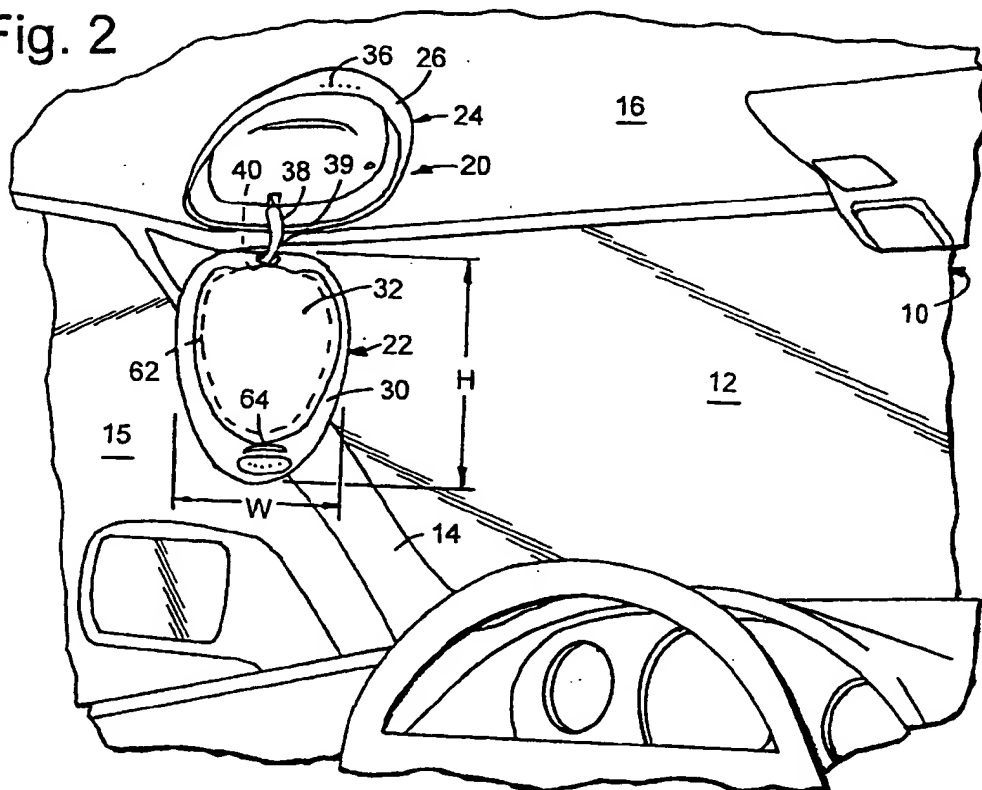
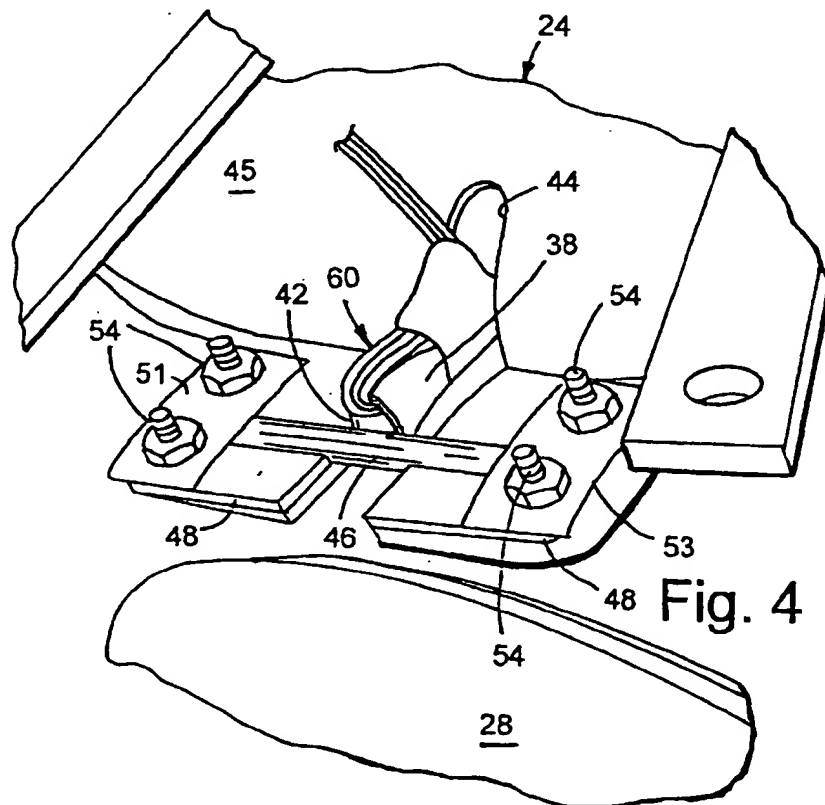
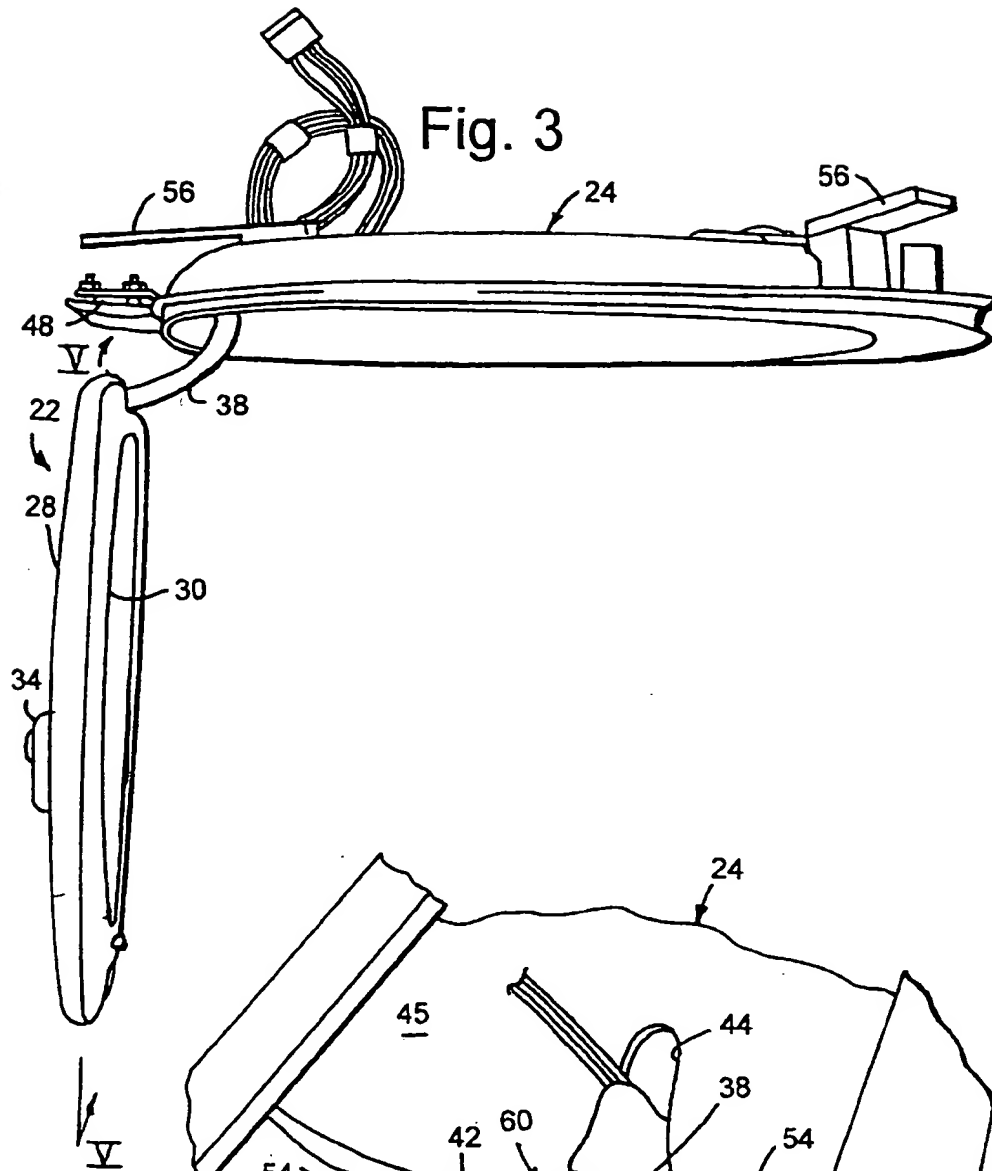


Fig. 2





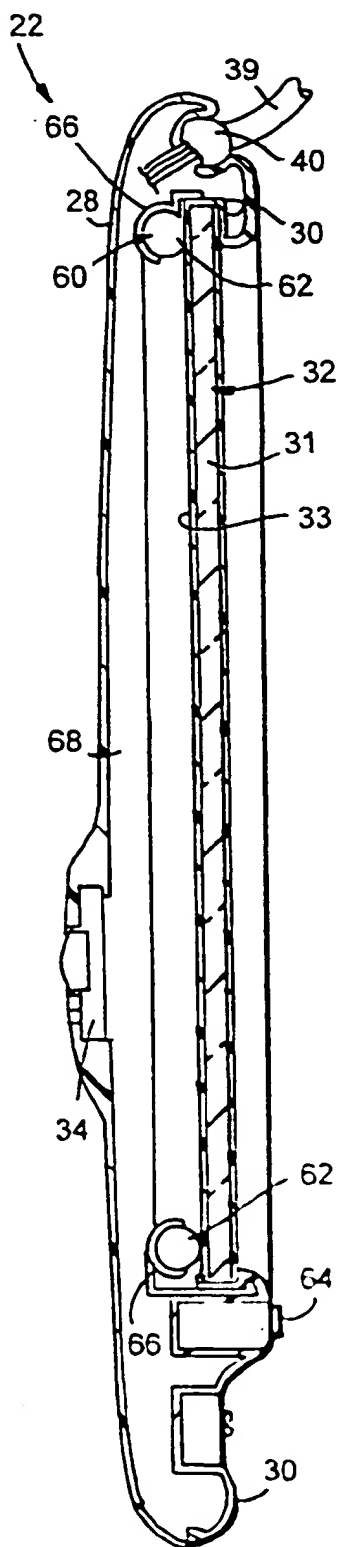


Fig. 5

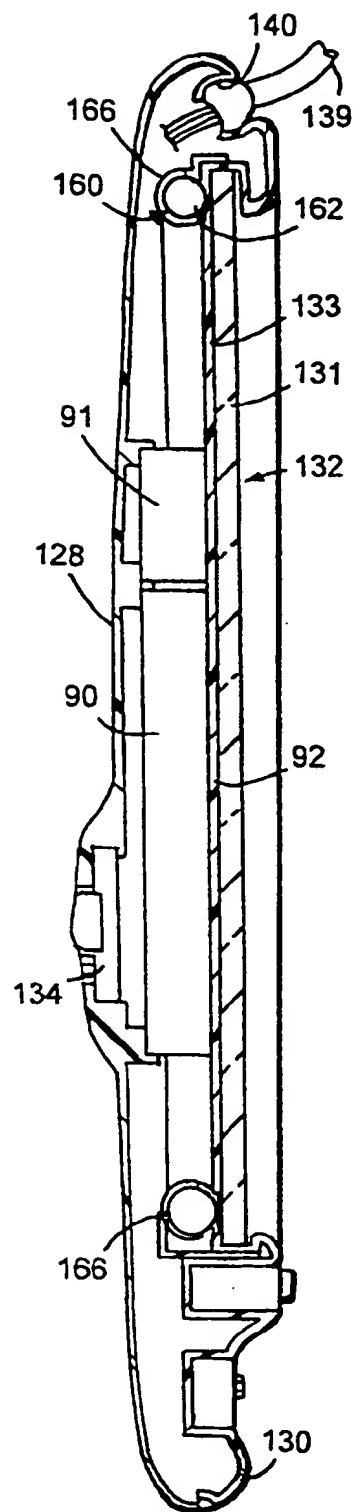


Fig. 8

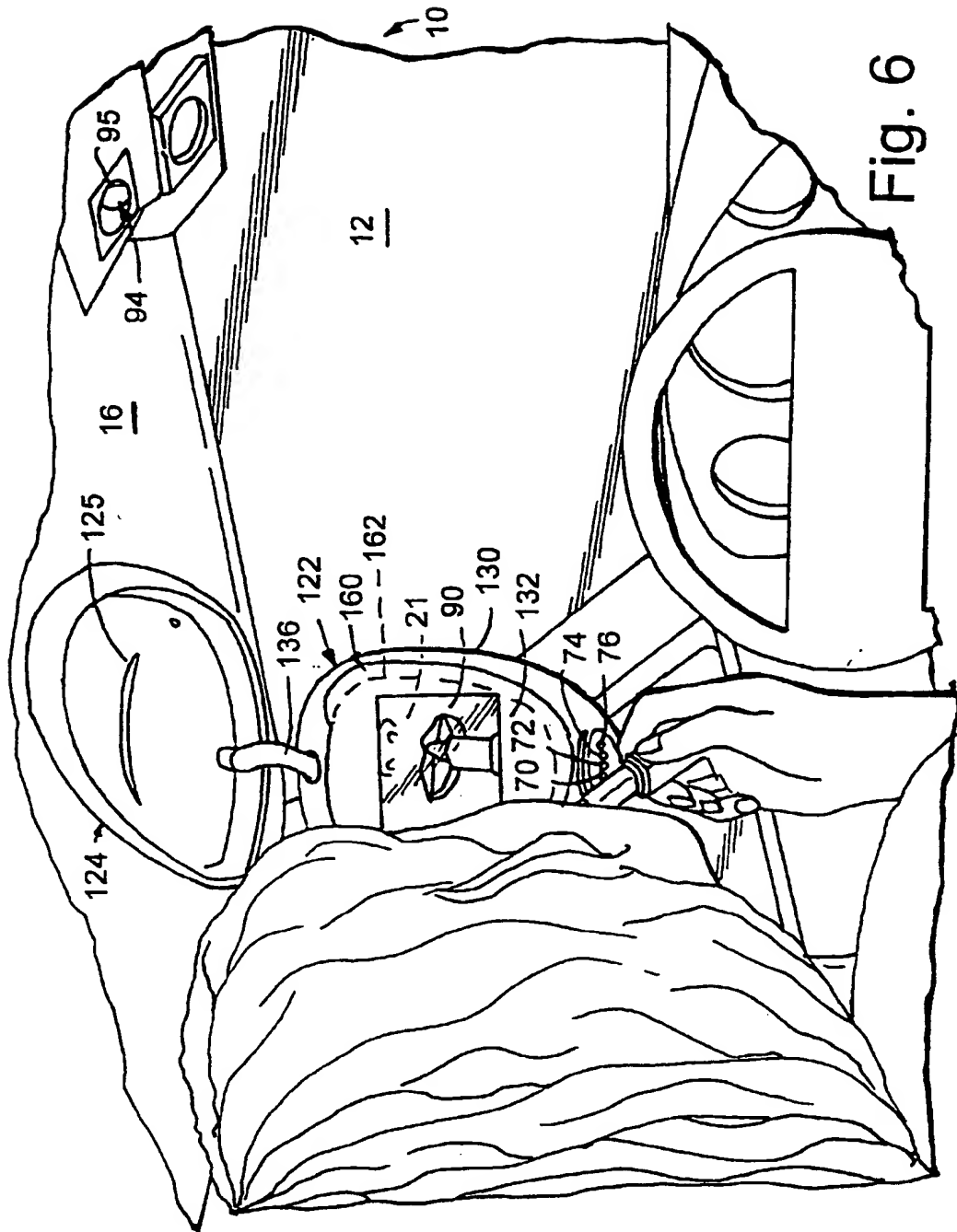


Fig. 6

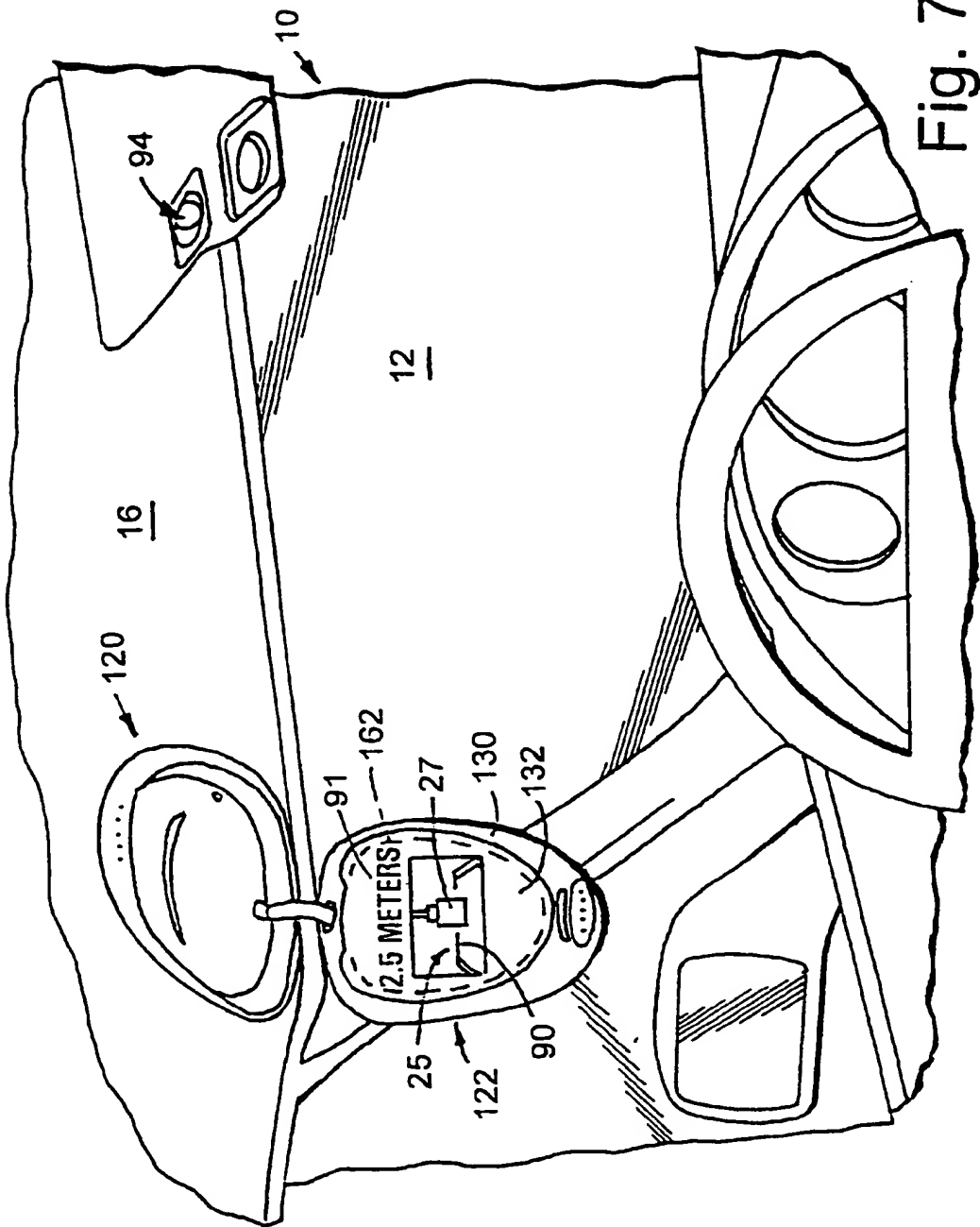


Fig. 7

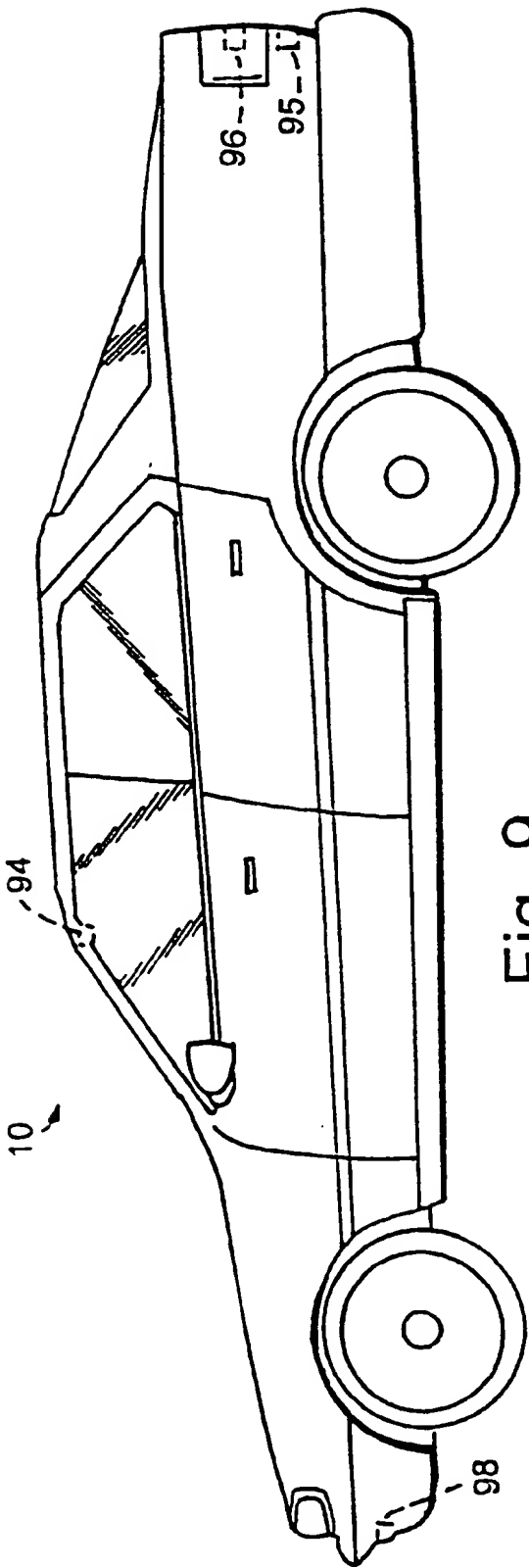


Fig. 9

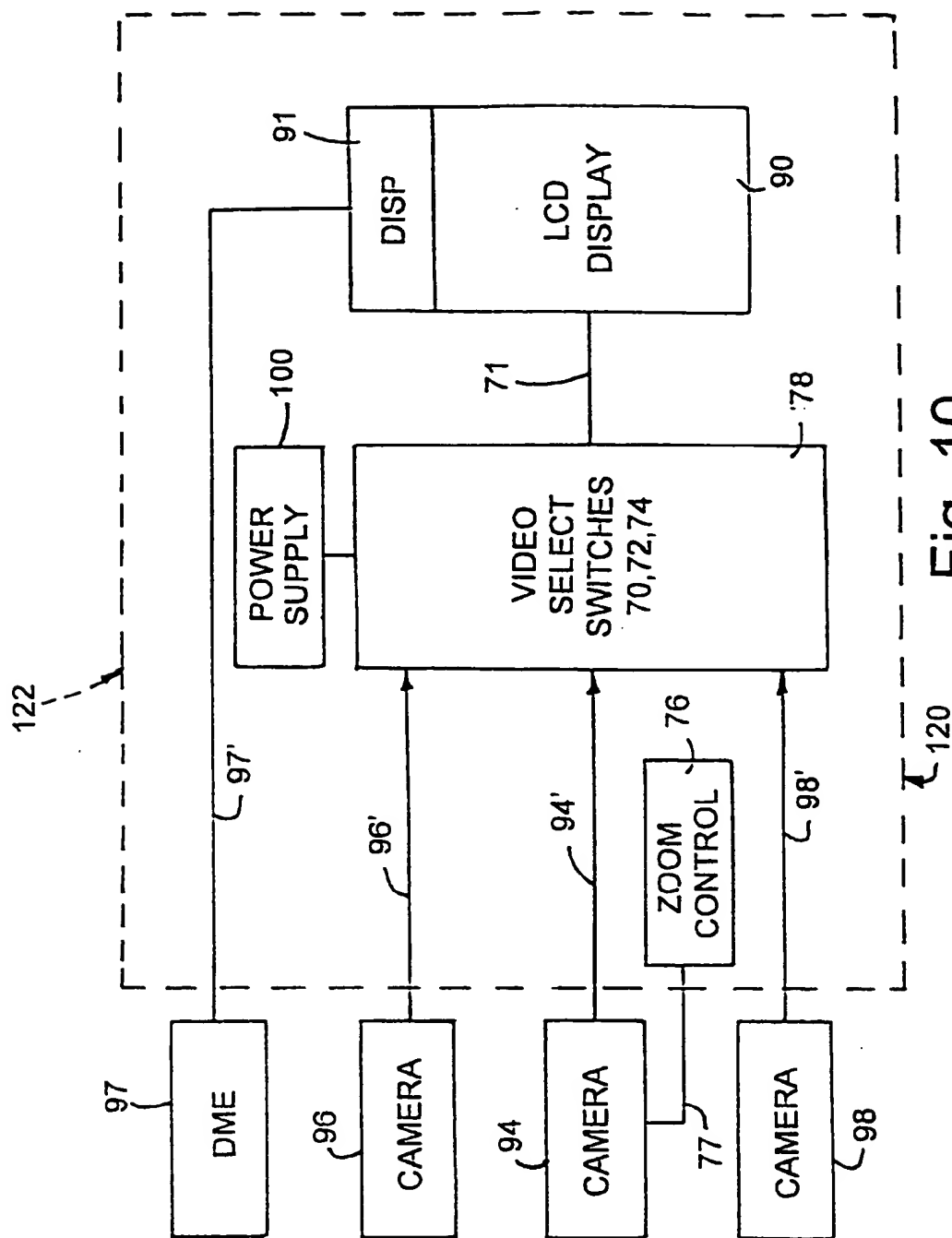


Fig. 10

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VANITY CONSOLE

BACKGROUND OF THE INVENTION

The present invention relates to a vanity console for use in a vehicle and one which provides an illuminated vanity mirror and/or video imaging.

Illuminated vanity mirror visors have been popular for many years and are a commonplace vehicle accessory. Although the vanity mirror incorporated in a visor is a convenient and cost efficient utilization of the visor for multiple functions, it does not always provide optimized functionality for a vanity mirror which is due, in part, to the shape constraints on a mirror mounted to a visor. U.S. Pat. Nos. 4,824,159 and 5,182,675 disclose vehicle mounted vanity mirrors which are shaped to conform more closely to the face of a user and which are mounted independently from a visor. Such mirrors function only as vanity mirrors and, when illuminated, the mirror area available, due to the placing of lights on either side of the mirror, is somewhat limited.

There remains a need to provide separate functions for visors and for illuminated vanity mirrors which optimize the functionality of the viewing structure. It is desirable, therefore, to provide a mirror which is proportionate to the shape of one's face and provide improved lighting. Further, it is desirable to provide a vanity console which can be located in an area which does not interfere with the operation of separate visors nor block the operator's or driver's view of the roadway.

SUMMARY OF THE PRESENT INVENTION

By providing a vanity console which can be optimally located in the vehicle headliner at one or more locations, each individual can be provided with an illuminated vanity mirror which is positioned conveniently for utilization as a vanity mirror without interfering with the operation of other vehicle accessories, such as overhead consoles, visors, or the like. In the preferred embodiment of the invention, a vanity console is provided with a housing having a mirror mounted therein made of a material providing both reflectivity and transmissivity characteristics. The vanity console is coupled to a storage housing by a mechanical linkage allowing the console housing to be moved from a recessed, stored position within, in the preferred embodiment, the headliner of a vehicle to various lowered, adjustable use positions.

In the preferred embodiment of the invention, the illumination means comprise a peripheral fluorescent tube extending around and behind the outer periphery of the mirror for directing light through the optical coating for use of the vanity mirror in low ambient light conditions. The mirror preferably is shaped to conform to the shape of a user's face. When the mirror is used without illumination, the entire surface area of the mirror is available for use and, when the illumination is activated, only a relatively small peripheral boarder directs illumination toward the user's face thereby optimizing the surface area of the mirror usable under both low and high ambient light conditions.

In another embodiment of the invention, positioned centrally behind the mirror is a video image source, such as an LCD display, which is supplied with video information from a variety of sources such as vehicle mounted cameras such that the vanity console can serve the additional function of video imaging. In some embodiments of the invention, the video imaging is enhanced vision providing, for example, magnification of a portion of the user's face. Alternatively, the system may include cameras directed forwardly and/or

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rearwardly of the vehicle for providing rear visibility for parking, internal rear visibility for conversation with rear seat passengers or forward visibility utilizing an enhanced light amplification camera for providing video images under low ambient light conditions.

Thus, the vanity console of the present invention provides both an improved vanity mirror for utilization by a vehicle operator or passenger and/or video imaging for various functions when connected to a source of video signals. These and other features, objects and advantages of the present invention will become apparent upon reading the following description thereof together with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary, perspective view of a vehicle including a vanity console embodying the present invention with the console shown in a stored position;

FIG. 2 is a fragmentary, perspective view of the console of FIG. 1 shown in a lowered use position with behind-the-mirror peripheral illumination;

FIG. 3 is an enlarged left side, elevational view of the vanity console shown in FIG. 2;

FIG. 4 is an enlarged, fragmentary, top rear perspective view, partly broken away, of the mechanical coupling of the vanity console housing to the storage housing shown also in FIGS. 1-3;

FIG. 5 is a cross-sectional view of the vanity console taken along section lines V—V of FIG. 3;

FIG. 6 is a fragmentary, perspective view of a vehicle showing an alternative embodiment of the invention;

FIG. 7 is a fragmentary, perspective view of a vehicle including yet another embodiment of the invention;

FIG. 8 is a vertical, cross-sectional view through the vanity console shown in FIGS. 6 and 7, showing the mounting of the video displays behind the partially reflective mirror of the vanity console;

FIG. 9 is a pictorial view of a vehicle showing the position of mounting of various cameras in a video imaging system such as that shown in FIGS. 6-8; and

FIG. 10 is an electrical circuit diagram in block form showing the electrical circuit employed for coupling the circuit elements employed in the video imaging system of the vanity console of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring initially to FIGS. 1 and 2, there is shown a vanity console 20 embodying the present invention mounted in a vehicle 10, such as an automobile, and in particular to the roof area above windshield 12 near the junction of the A-pillar 14 with the windshield and roof. The vanity console 20 is, in the preferred embodiment, recessed within the headliner 16 and is positioned in the embodiment shown in FIG. 1 in the upper left front corner of the driver's side of the vehicle. The vehicle may include a slide out visor assembly 18 of the type disclosed in U.S. Pat. No. 5,328, 277, although a conventional visor assembly can be employed with its pivot rod bracket positioned below console 20.

Console 20 comprises a vanity mirror housing 22 movably coupled to a recessed storage housing 24 which may include a decorative bezel 26. Housing 22 comprises an outer panel 28 forming the outer decorative covering for the

housing 22 and an inner frame 30 (FIGS. 2 and 3) for a vanity mirror 32 mounted, as best seen in FIG. 5, between panel 28 and frame 30. Recessed within the surface of panel 28 may be a trainable garage door opening transmitter 34 (FIGS. 1 and 5) of the type disclosed in U.S. Pat. No. 5,442,340. The vanity console 20 provides a convenient location for operation of such a garage door opening transmitter which can also be employed for the activation of interior home lighting utilizing one of the three available channels. A latch assembly with an actuator pad 36 on the bezel 26 holds the movable console housing 22 within storage housing 24. When actuator pad 36 is depressed by the operator, the latch, which can be of conventional design, allows the vanity console which is coupled to storage housing 24 by a mechanical linkage, shown in FIGS. 3 and 4 and described below, to drop down sufficiently to allow the user to move the console downwardly into a selected use position as shown, for example, in FIG. 2 in which the mirror 32 is exposed for use.

As best seen in FIG. 2, vanity housing 22 is somewhat oval and generally tear-dropped or face shaped such that mirror 32 can approximate the proportions of the face of a user. Thus, the height "H" of the housing 22, as seen in FIG. 2, is sufficiently greater than its width "W." In one embodiment, the height "H" of housing 22 was approximately 7 inches while the width "W" was approximately 5.75 inches. Although the vanity console 20 as shown in FIGS. 1 and 2 is mounted to the upper left front corner of the vehicle, a similar console can be mounted in other locations, such as the right front corner for the passenger, the center of the vehicle if it does not include an overhead console with, for example, a compass, or in individual rear seating areas by mounting such consoles to the vehicle roof in appropriate alignment with rear seats of the vehicle. Thus, a vehicle may contain a plurality of such vanity consoles for providing personalized viewing for each occupant. The details of construction of the illuminated vanity console 20 are now presented in conjunction with FIGS. 1-5.

The console housing 22 is pivotally mounted to the storage housing 24 by means of a mechanical linkage comprising, in the preferred embodiment as seen in FIGS. 2-5, a curved arm 38 having a lower end 39 coupled to housing 22 by a ball joint assembly 40 (FIG. 5) of conventional construction to allow the housing 22 to be adjustably pivoted about end 39 of arm 38. The opposite end 42 (FIG. 4) of arm 38 extends through a slot 44 in the rear wall 45 of storage housing 24, as best seen in FIG. 4, and is coupled to a transversely extending pivot rod 46 which is mounted to a split flange 48 extending from the periphery of housing 24. In the preferred embodiment, flange 48 is bifurcated and includes semicylindrical sockets 50, 52 for receiving the pivot rod 46 which is captively held to the bifurcated flange 48 by means of keeper plates 51, 53 secured to flange 48 by suitable fasteners such as nut and bolt combinations 54. The hollow pivot arm 38 allows a plurality of electrical conductors 60 to extend from within the console housing 22 to the vehicle's electrical system for providing operating power and video signals for the video imaging system of the present invention.

Housing 24 is mounted to the sheet metal roof of a vehicle using suitable mounting brackets 56 which extend outwardly from the periphery of the housing 24, as illustrated in FIG. 3, at various locations to secure the housing either directly to the sheet metal roof of the vehicle or to a reinforced area of the headliner 16 if console 20 is pre-mounted to the headliner as a preformed assembly.

The mirror 32 of the preferred embodiment is, as best seen in FIG. 5, a two-way type mirror which includes an outer

glass surface 31 to which there is applied a partially reflective and partially transmissive coating 33 to provide partial reflectivity and partial transmissivity for mirror 32. In the preferred embodiment of the invention, coating 33, which is a standard commercially available film which can be vacuum deposited onto the rear surface of glass panel 31, had a reflectivity of from 50 to 90 percent and a transmissivity of from 50 to 10 percent, respectively. The reflectivity, in the preferred embodiment, was about 60 percent, while the light transmissivity was about 40 percent. The purpose of employing the two-way mirror 32 for the vanity console is to allow illumination means 60 positioned behind the mirror 32 and/or a video monitor, as described in another embodiment below, to be viewable and visible from the front side of the mirror only when actuated. The mirror 32 appears as a standard mirror when such illumination means 60 are not activated.

In a preferred embodiment of the invention as seen in FIGS. 2 and 5, illumination means 60 comprises a peripheral fluorescent tube 62 with a generally circular cross section extending around the periphery of mirror 32 to provide even illumination for the face of the user. When actuated by light switch 64 (FIG. 2), the fluorescent tube 62 provides light through the transmissive film 33 to the face of the user for illuminating the face of the user with the central area of the mirror still appearing as a mirror to the user. Fluorescent tube 62 can be any glass tube filled with a suitable fluorescent gas mixture such as mercury-argon to provide the desired light frequency for utilization as a vanity mirror light. Tube 62 is mounted to the frame 30 utilizing suitable mounting brackets such as brackets 66 (FIG. 5) spaced at suitable locations and secured to the inner surface of the periphery of frame 30 to provide the secure mounting of the light tube 62. In FIG. 2 tube 62 is shown in phantom to illustrate that it is substantially invisible behind mirror 32 except when illuminated.

The power supply for actuating the fluorescent tube 62 can also be suitably mounted within the central open area 68 of console housing 22 and is coupled to the vehicle's 12-volt electrical system through the actuating switch 64 which is coupled to the vehicle's operating system through a suitable power conductor included in the bundle of electrical conductors 60. The mirror 32 is commercially available from a variety of commercial suppliers, such as Libbey Owens Ford, and can be manufactured with the desired light transmissive/reflective characteristics for a given installation. Similarly, illumination means 60, although in the preferred embodiment comprises a fluorescent tube, may take on other forms of illumination such as conventional lamps. It has been discovered, however, that the peripheral boundary lighting provided by the continuous fluorescent tube 62 is preferable.

In addition to providing the illuminated vanity mirror with concealed illumination to allow the full surface of the mirror to be used under normal ambient lighting and an illuminated mirror to be used under low ambient lighting, the console 20 of the present invention can also provide video imaging as illustrated in the embodiments shown in FIGS. 7-10. In such embodiments, a video monitor is incorporated in the space 68 (FIG. 5) of the illuminated vanity console 22 which provides the same illuminated or non-illuminated vanity mirror functions as before with the addition of the capability of video imaging behind the light transmissive mirror 32 when desired. The video imaging is now described in connection first with the display functions provided in FIGS. 6 and 7 and subsequently the description accompanying FIGS. 8-10.

Referring to FIG. 6, there is shown a vanity console 120 which is of the same construction as vanity console 20 with similarly identified components including the numerical prefix "1." Console 120 additionally includes of video monitor 90, video source selector switches 70, 72, 74 and zoom control switch 76, which switches are mounted to the lower end of housing 130. As seen in FIGS. 6 and 8, positioned centrally behind the mirror 132 is a flat screen video monitor 90 having a video image projecting surface 92 immediately adjacent film 133 such that images projected by monitor 90 can be seen through mirror 132 as seen in FIG. 6. A first television camera 94 has a zoom lens 95 controlled by zoom control switch 76 and is pointed toward the user's face. Camera 94 is activated by switch 70 which also couples its composite video output signals to the input of monitor 90. Camera 94 thus can provide an enhanced close-up and magnified image, shown as the lip area 21 of the user 23 in FIG. 6, such that such a magnified image can be viewed through the vanity console 120. With such system, it may be desirable to actuate the illumination means 160 to provide sufficient light for camera 94 to provide a clear magnified image of a portion of the user's face. Camera 94 can be a conventional color CCD type camera with a controllable zoom lens 95 to also provide a wide angle field of view such that the user can view rear seat passengers either for conversational purposes or for tending to infants or young children. Thus, camera 94 typically will be mounted in an area proximate the user 23 but also facing generally rearwardly such that it can provide a clear line of vision to both the face of the user as well as the rear seat area of the vehicle. Video monitor 90 can be a conventional flat screen color LCD type monitor, preferably having a diagonal screen of approximately 3 to 4 inches and which receives composite N.T.S.C. video signals from one of a plurality of cameras such as camera 94.

In the embodiment shown in FIG. 7, the vanity console 120 includes not only a video monitor 90 but, in addition, a distance display 91 which operates in conjunction with an ultrasonic or infrared distance measuring sensor 97 associated with a rear vision camera 96 (FIG. 9). Camera 96 is mounted in the rear area of the vehicle, preferably in the rear bumper area behind a suitable sealed window for providing protection for the camera from the environment. A video and power supply conductor 96' extends from camera 96 as described in connection with FIG. 10 to provide composite color video signals to the monitor 90 mounted within the body of console housing 122. Camera 96 can provide a wide angle rear view of traffic or objects behind the vehicle.

As seen in FIG. 7, a video image 25 from camera 96 is displayed by monitor 90 showing the proximity of, for example, a lamp post 27 as being 2.5 meters from the rear bumper area as indicated on display 91 positioned above the monitor display surface 92. The distance measuring (D.M.E.) system 97 is a commercially available unit which provides digital signals from a sensor unit representing the distance of an object from the sensor. Such signals are coupled to an LED display 91 for display. Such D.M.E. units are generally commercially available.

In addition to cameras 94 and 96 as shown in FIGS. 6 and 7, as seen in FIG. 9, a vehicle 10, such as an automobile may also include a forward facing camera 98 which can be employed for selectively providing a wide angle view of the roadway. Camera 98 may be coupled, if desired, to a video tape recorder as well as to monitor 90 for providing a record of areas traveled by, for example, a family on vacation. Thus, in addition to providing front visibility, camera 98 can be used as a video signal source for recording scenery. If

desired for use under low ambient light conditions, camera 98 can be of the type including image enhancing sensors such as are commercially available from IT&T to provide low light enhanced visibility under poor lighting conditions to provide a visual aid to the vehicle operator under such conditions. It is to be understood, however, that such enhanced light imaging is used as a further assistance to the vehicle operator and not as the primary field of vision for the vehicle operator. Each of the cameras 94, 96 and 98 can be adjustably mounted to the vehicle to allow the vehicle operator to adjust the pointing direction for particular applications. Such adjustable camera mounts are conventional.

Turning now to FIG. 10, there is shown a block electrical circuit diagram of the system in which each of the cameras 94, 96, 98 are coupled by a video select control circuit 78 including switches 70, 72, 74 for providing a video output signal by a conductor 71 to the video input of monitor 90. Input from camera 96 is applied to video select console 78 through video conductor 96'. Similarly, cameras 94, 98 are coupled via conductors 94', 98' to the input of video selector circuit 78 such that any one of the camera's composite video output signals can be selected for display on monitor 90. Similarly, display 91 is coupled to the distance measuring sensor 97 by means of conductors 97' to provide signals applied to display 91. Zoom control switch 76 is a conventional spring loaded two-position switch coupled to camera 94 by means of a pair of conductors 77 to provide zoom in and zoom out control signals for the camera lens 95. In some installations, it may be desirable to also provide cameras 96 and 98 with zoom lenses, in which case the video select switch console 78 may also include conventional circuits for coupling zoom control 76 to the particular camera selected. Suitable operating power from a vehicle's power source 100 is selectively applied to the cameras by the actuation of the selector switches 70, 72, 74. Such power can be applied through conductors 94', 96', 98' if desired to minimize the required wiring. In the embodiment shown in FIGS. 1-5 and 6-10, when the video monitor 90 is not activated by the actuation of one of the switches 70, 72, 74 a first time (a second depression deactivating the camera and also power to display 90), the mirror 132 can be utilized with or without the back lighted illumination means 160 to provide a vanity mirror for normal use. As with the vanity console 20, consoles 120 can be positioned at various locations within the vehicle and may include additional switch circuits so that each monitor can be coupled to a selected camera or other video source.

These and other modifications to the preferred embodiments of the invention described herein can be made by those skilled in the art without departing from the spirit or scope of the invention as defined by the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A vanity mirror console for a vehicle comprising:

- a housing;
- a partially reflective two-way mirror mounted to said housing;
- a video camera mounted to the vehicle for providing a video image; and
- a video display mounted in said housing behind said two-way mirror for providing a video image through said mirror to be visible to a user facing said mirror, wherein said camera has a lens positioned to face the user of said vanity mirror console and an electrical circuit coupling video signals from said camera to said video display for providing a video image of the user's face.

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2. The vanity console as defined in claim 1 wherein said lens is a zoom lens and said housing includes a control for operating said zoom lens.

3. The console as defined in claim 1 and further including a source of illumination positioned in said housing behind said mirror and visible when actuated for projecting light outwardly through a first portion of said mirror to provide illumination to the face of a user.

4. The console as defined in claim 3 wherein said partially reflective mirror has a reflectivity from about 50% to 90% and a corresponding light transmissivity from about 50% to 10%.

5. The console as defined in claim 4 wherein said reflectivity is preferably about 60% and said transmissivity is about 40%.

6. A vanity mirror console for a vehicle comprising:

a housing mounted in the vehicle;

a partially reflective vanity mirror mounted to said housing;

a video display mounted in said housing behind said mirror for providing a video image through said mirror to be visible to a user; and

a plurality of video cameras for mounting to a vehicle, wherein a first of said cameras has a lens facing the user of said video console and a circuit selectively coupling video signals from said first camera to said video display for providing a video display of the user's face on said video display.

7. The vanity console as defined in claim 6 wherein said lens is a zoom lens and said housing includes a control for operating said zoom lens.

8. The console as defined in claim 6 wherein a second camera is mounted to the vehicle with a lens facing rearwardly to view objects outside and behind the vehicle, and

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further including a circuit for selectively coupling said first or said second camera to said video display.

9. The console as defined in claim 8 and further including a third camera for mounting to a vehicle in a forward facing direction for viewing the area in front of the vehicle and wherein said circuit selectively couples at least one of said first, second or third cameras to said video display.

10. The console as defined in claim 6 wherein said partially reflective mirror has a reflectivity from about 50% to 90% and a corresponding light transmissivity from about 50% to 10%.

11. The console as defined in claim 10 wherein said reflectivity is preferably about 60% and said transmissivity is about 40%.

12. A vanity mirror console for a vehicle comprising:

a housing;

a partially reflective mirror mounted to said housing;

a source of illumination mounted in said housing behind said mirror and only visible when actuated for directing illumination outwardly from said source through a portion of said partially reflective mirror to provide illumination to the face of a user;

an electrical circuit including a switch for selectively actuating said source of illumination;

a video display mounted in said housing behind said mirror for providing a video image visible through said mirror when actuated; and

at least one video camera for mounting to a vehicle and a circuit selectively coupling video signals from said at least one camera to said video display for providing video signals for display, wherein said at least one video camera has a lens facing a user of said video console for providing a video display of the user's face.

* * * * *

Space

With lower prices for both larger monitors and flat-panel displays, a roomier screen—or desktop—is now within reach.



Call it the incredible shrinking work space. Over the past few years, bulkier monitors have all but overrun the tops of our desks. Their screens, filled nearly to

overflowing with all the icons, web pages, and digital photographs we've crammed onto them, haven't fared much better. Plain and simple, computer users need more real estate—on both their screens and their desks.

A remedy for both shortages exists in the form of a 21-inch flat-panel monitor made from a thin liquid-crystal display (LCD) similar to those used in laptops. But a flat-panel that large comes with a price tag in the thousands. What are realistic options if your budget is in the hundreds?

If a larger screen is a must, a 19-inch cathode ray tube (CRT) monitor may be the answer. Prices have fallen so much in the past couple of years that you can find plenty of these in the \$300 to \$600 range. If desk space is your priority, a space-saving 15-inch flat-panel can now be had for as little as \$600. While costlier than most 19-inch CRTs, that's still 30 percent cheaper than those flat-panels were last year, the result of an increased supply.

To help you choose among the monitors most people buy, we tested five 15-inch flat-panel LCDs, nine 17-inch CRTs (the type that's usually bought with a new computer or as a replacement for an aging monitor), and seven 19-inch CRTs. All 21 models

work with an analog computer video card and are compatible with a Windows-based PC or a Macintosh. The exception is the *Apple Studio Display*, which is strictly for PowerPC G4-based Macs. Four very good CRTs tested for last June's report are still available, and they are noted in the Ratings.

SIZING THEM UP

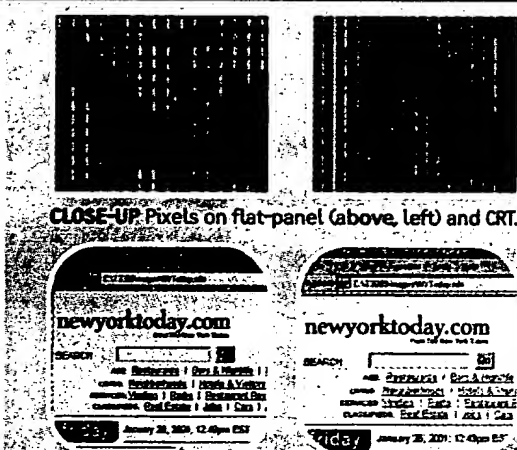
The CRT size displayed in an ad is generally not the size of the image you see, but the nominal size of the entire tube, including

the part that's not visible. Advertisers quote the nominal size, which makes monitors seem larger. Look instead for the viewable-image size (VIS), which is the diagonal measurement of the image you'll see. It's typically about an inch smaller than the nominal size. As a result of a class-action suit, ads must disclose a CRT's VIS; but to find it, you may have to check the fine print. A flat-panel's VIS is the same as its nominal size, making a 15-inch flat-panel nearly the equal of a 17-inch CRT. (The CRT provides only 14 percent more viewable area.)

CRT: Footprint vs. image size. Footprint is the area a monitor occupies on your desktop. It's an issue only for a CRT, whose girth increases with larger screen size. To estimate whether a CRT will fit in your particular space, figure on a footprint as deep and wide as the monitor's nominal screen size. A larger screen lets you view several files simultaneously or see more of one file—more lines of text in a letter, say, with the characters large enough to be read easily. For example, a 19-inch CRT provides about 25 percent more space for images and words than a 17-inch one, but the larger CRT has a footprint about 19 inches deep. A few so-called short-depth 19-inch CRTs, such as the *Gateway VX920*, the *IBM G96*, and the *Hitachi CM771*, are an inch or two shallower than the rest, but they are still bulky.

There's no trade-off to make between a flat-panel's screen size and footprint. Even the largest flat-panels have footprints just a few inches deep, much smaller than a CRT's. (Don't confuse a flat-panel display with a flat-screen monitor, which is a CRT with its face flattened to reduce glare and reflections.)

Flat-panel vs. CRT monitor



CLOSE-UP: Pixels on flat-panel (above, left) and CRT.

AT NORMAL VIEWING DISTANCE The only obvious difference is the CRT's lower contrast (above, right).

Because they rely on different technologies, flat-panels and CRTs produce different, though equally clear, images at normal viewing distances.

A flat-panel's squarish pixels line up in rows and columns, producing images with a slightly grainy texture especially noticeable with text. Unless viewed nearly straight on, flat-panels lose much of their contrast.

A CRT's pixels are illuminated differently, producing a softer image viewable from virtually any angle. Its images exhibit somewhat less contrast than those on a flat-panel.

Final arrangements

As an estate-planning and elder-law attorney, I agree with your conclusion that prepaying a funeral may not be the best use of money in most cases. There is one situation where it should be considered, however. If a person has to qualify for Medicaid, the general rule is that assets must be reduced down to \$2,000 for a single person.

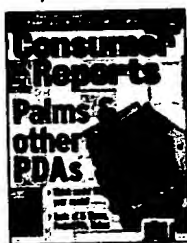
One standard recommendation is to prepay funeral and burial expenses. That hastens the spend-down and achieves Medicaid eligibility that much sooner. Then, upon the elder person's death, the family will not have to dig into its pockets to pay funeral bills.

K. GABRIEL HEISER Brentwood, Tenn.

Your May report on prepaid funerals brought back some very painful memories. My mother paid \$111 a month out of her \$400 Social Security check for a prepaid funeral plan to spare my brother and me the expense and anxiety of dealing with funeral arrangements. When she died she had paid only \$4,631 for the plan. The funeral cost \$7,617, administrative fees were \$541, and cemetery charges amounted to another \$1,306. This prepaid funeral cost my brother and me \$4,833.

I tell everyone who's considering a prepaid funeral plan to put the money in the bank and list a beneficiary, just as you recommended. These pre-need plans are truly unneeded.

MICHAEL LUSTER Kansas City, Mo.



A prepaid funeral worked for our family. My father, who died in 1976, didn't have a prepaid funeral. Dealing with the arrangements was an emotional nightmare. After my mother remarried, I persuaded her and my stepfather to make arrangements in advance. My folks chose exactly what they wanted. Perhaps living in a small town helped. The salesman was a longtime acquaintance. When my stepfather died three years later, we were able to take care of the funeral without undue duress. Not having to "deal" in a rush of time and emotions was a blessing.

MARILYN LYNCH Elk City, Okla.

Safety Assessment update

The safety reports in the April auto issue noted that the Nissan Xterra sport-utility vehicle tipped over during the government's side-impact crash tests. Unfortunately, you did not have access to critical information regarding that test: A high-speed tow cable interfered with one of the Xterra's tires, effectively tripping the vehicle and causing it to tip. Three other side-impact tests that did not involve cable interference resulted in no rollover of the Xterra. The government has acknowledged the problems with its test. It is misleading to say that the Xterra rolled over without also noting that the test was abnormal.

DEBRA SANCHEZ FAIR

Vice President, Corporate Communications
Nissan North America Inc., Gardena, Calif.

The National Highway Traffic Safety Administration (NHTSA) says it doesn't know whether the Xterra rolled over solely because of the side-impact crash or because of the crash and cable

interference. However, the rollover has no bearing in terms of gauging performance in that test. NHTSA does not factor rollovers into its side-impact score. Consequently, the rollover did not affect the CR Safety Assessment ranking for the Xterra. It ranked third among small SUVs, after the Mercedes-Benz ML430 and Jeep Grand Cherokee.

Cause and effect

It made my heart sing to read the May "Your Health" column about the health effects of coffee. Nearly all journalists would have assumed from the perceived effect of coffee on miscarriage that it was an obvious cause-and-effect relationship. Your writer didn't make that assumption, instead making the following statement: "You're never sure whether drinking coffee increases the risk of a miscarriage or whether many women who have a normal, healthy pregnancy just lose their taste for coffee." Bravo for understanding the difference between relationships and direct causality.

SUSAN BOGART Los Gatos, Calif.

Digital divides

I was appalled by the May letter to the Editor from Richard Nolan, criticizing your call for subsidies to help low-income people gain Internet access. An enlightened public realizes that our society benefits when every citizen has a realistic chance at a productive life and the opportunity to fulfill his or her potential. In the digital age, fulfilling that potential requires equal access to technology.

MARY LANDOLFI West Orange, N.J.

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United States Patent [19]

Abersfelder et al.

[11] **Patent Number:** 5,646,614[45] **Date of Patent:** Jul. 8, 1997**[54] SYSTEM FOR MONITORING THE FRONT OR REAR PARKING SPACE OF A MOTOR VEHICLE**

[75] **Inventors:** Guenter Abersfelder; Helmut Grantz; Wolfgang Odebrecht, all of Sindelfingen, Germany

[73] **Assignee:** Mercedes-Benz AG, Stuttgart, Germany

[21] **Appl. No.:** 328,671

[22] **Filed:** Oct. 25, 1994

[30] Foreign Application Priority Data

Oct. 25, 1993 [DE] Germany 43 36 288.5

[51] **Int. Cl.⁶** B60Q 1/48

[52] **U.S. Cl.** 340/932.2; 340/903; 340/435; 348/118

[58] **Field of Search** 340/932.2, 903, 340/435, 904, 901; 348/113, 116, 118, 135, 143, 148, 149, 169, 170, 171, 172

[56] References Cited**U.S. PATENT DOCUMENTS**

5,031,049	7/1991	Toyama et al.	358/227
5,091,781	2/1992	An	348/169
5,172,235	12/1992	Wilm et al.	348/149
5,235,315	8/1993	Cherry et al.	340/435
5,253,050	10/1993	Karasudani	348/118
5,289,321	2/1994	Secor	348/118
5,304,980	4/1994	Maekawa	348/170
5,314,037	5/1994	Shaw et al.	340/903
5,373,319	12/1994	Lee	348/169
5,386,285	1/1995	Asayama	340/904
5,410,346	4/1995	Saneyoshi et al.	348/116
5,461,357	10/1995	Yoshioka et al.	340/435

FOREIGN PATENT DOCUMENTS

0 314 642	5/1989	European Pat. Off.
0 529 619	3/1993	European Pat. Off.
2465612	3/1981	France
2 646 383	11/1990	France
2673499	9/1992	France

2 687 000	8/1993	France
40 40 894	4/1992	Germany
93 03 338.9	7/1993	Germany
43 03 066	9/1993	Germany
92 15 502.2	4/1994	Germany

OTHER PUBLICATIONS

Japanese Abstract No. 61-202959, vol. 11, No. 34 (M-558), Jan. 31, 1987.
Japanese Abstract No. 63-009813, vol. 12, No. 210 (P-717), Jun. 16, 1988.
Japanese Abstract No. 4-170164, vol. 16, No. 475 (E-1273), Oct. 2, 1992.
Japanese Abstract No. 4-274941, vol. 17, No. 68 (M-1365), Feb. 10, 1993.
Japanese Abstract No. 62-70780, vol. 18, No. 682 (M-1729) Dec. 22, 1994.
Japanese Abstract No. 62-81455, vol. 94, No. 10, Oct. 7, 1994.

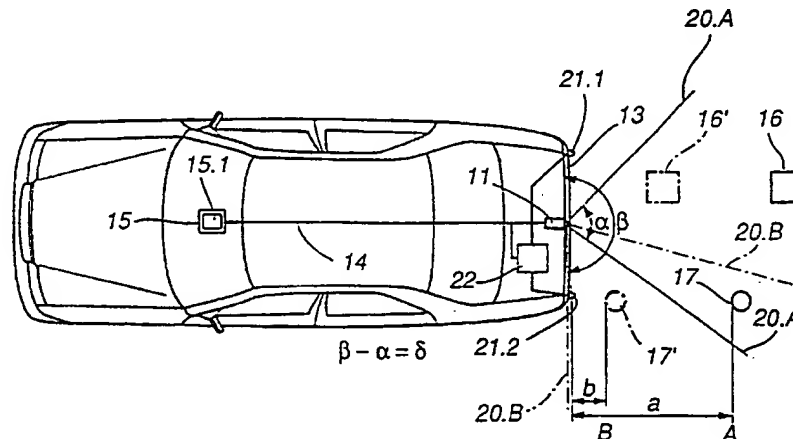
(List continued on next page.)

Primary Examiner—Brent A. Swarthout
Attorney, Agent, or Firm—Evenson, McKeown, Edwards & Lenahan, P.L.L.C.

[57] ABSTRACT

A system for monitoring the rear or front space of a motor vehicle being parked is provided. The system is based on a video camera having an image sharpness control, which can follow an object once detected, in terms of its sharpness, with the camera's autofocus over the whole search field, for example, by using fuzzy logic. The device uses this property for an image-processing-supported tracking of the viewing angle of a video camera which is designed to be pivotable and is used for rear-space or front-space monitoring, by which an object limiting the rearward or forward penetration depth of the vehicle can be seen up until contact with the vehicle's bumper. The device eliminates obstacles which previously prevented the use of such video cameras in the rear space monitoring of private cars. A corresponding device can also be provided and used for monitoring the front space of a vehicle.

12 Claims, 1 Drawing Sheet



OTHER PUBLICATIONS

Abstract—Japanese No. 1-164637, Jun. 28, 1989, M-874
Sep. 27, 1989, vol. 13/No. 432.

Abstract—Japanese No. 2-299944, Dec. 12, 1990, M-1085
Feb. 22, 1991 vol. 15/No. 77.

Abstract—Japanese No. 3-543, Jan. 7, 1991, M-1091 Mar.
11, 1991 vol. 15/No. 101.

Abstract—Japanese No. 2-274941, Sep. 30, 1992, M-1365
Feb. 10, 1993 vol. 17/No. 68.

IEEE Spectrum entitled "Fuzzy logic flowers in Japan", Jul.
1992, pp. 32-35.

Derwent WPI Abstract Accession No. 92-359447/44.

SYSTEM FOR MONITORING THE FRONT OR REAR PARKING SPACE OF A MOTOR VEHICLE

BACKGROUND AND SUMMARY OF THE INVENTION

The invention relates to a system for monitoring the front or rear parking space of a motor vehicle and, more particularly, to a system having a video camera built into either the front or rear of the vehicle and a viewing and monitoring device in the field of view of the vehicle driver connected to the camera. The field of view is fitted with a display screen.

Approach problems during the parking of vehicles, such as avoiding other vehicles, walls and the like, are well known. Known active systems which attempt to alleviate the approach problems, such as those having infrared light and/or ultrasonic sensors, suffer from a lack of measurement accuracy, reliability and reproducibility.

One alternative is represented by rear space video cameras, whose use in the area of commercial vehicles, such as airport courtesy vehicles, is already known. While the use of such video cameras, specifically in private cars, would be desirable due to the fact that parking spaces are becoming ever tighter, often requiring driving accuracy to within centimeters, the increasingly obscure rear parts of vehicles make this more difficult. The rear geometry of normal private cars, however, makes extremely wide angle lenses necessary. Unfortunately, such wide angle lenses provide the vehicle driver with an image which can hardly be interpreted.

There is therefore needed a system for monitoring the front or rear parking space of a motor vehicle which delivers to the vehicle driver a clear and easily interpretable display of the vehicle front or rear space and its boundary edges or obstacles.

These needs are met according to the present invention by a system having a video camera built into either the front or rear of the vehicle and a viewing and monitoring device in the field of view of the vehicle driver connected to the camera. The field of view is fitted with a display screen. The video camera is equipped with means for its pivoting (turn and tilt) as a function of electric drive signals and is of the type having object referenced image sharpness control of its optics. This sharpness control is effective over the whole image angle detected, so that a corresponding sharpness measuring field is capable of following an object once detected over the whole screen. The system further includes an image processing unit which subdivides the image picked up into fields or quadrants and/or an edge region outside and a central region inside an auxiliary frame. The image processing unit is capable of discerning the instantaneous position of the sharpness measuring field with reference to at least one of the fields or quadrants and/or to the auxiliary frame and, as a function of a tendency of the sharpness measuring field to leave the original field/quadrant, not to reach a predetermined field or predetermined quadrant and/or to cross from the central region over the auxiliary frame out into the edge region of the image field. The image processing unit generates the above-mentioned drive signals for the pivoting means according to the measure that the pivoting of the camera thereby effected counteracts the triggering tendency or neutralizes or eliminates the triggering tendency.

The present invention makes use of the fact that modern video cameras, which increasingly are controlled by "fuzzy

logic", can follow an object once detected, in terms of its sharpness, with the autofocus (AF) over the whole search field or over the whole image angle, by which means the distance measuring field or sharpness measuring field moves along with the object, that is to say, in the case of its approach or removal is virtually dragged with it. In this respect, the sharpness adjustment is no longer search-field-referenced but object referenced.

According to the present invention, this property is used for an electronic tracking of the viewing angle of such a video camera used for rear-space or front-space monitoring. Because of this, an object limiting the rearward or forward penetration depth of the vehicle can be seen up until contact, for example, with the bumper and the remaining distance up until its disappearance can be seen or easily judged.

In this case, as a whole, the device according to the invention exhibits the advantage that camera lenses of very compact construction can be used, without the requirement of extending the camera for the purposes of realizing a sufficient viewing angle. The assembly of the camera is thus possible within the vehicle contour. The image interpretation is simplified for the driver by the concentration of the image section on the essential obstacle, and complicated image processing and image preparation, as are unavoidable in the case of extreme wide angle optics, can be eliminated.

Accordingly, a "passive" system having an object-referenced guided video camera can be supported at least by means of an additional "active" system, for example an ultrasonic or infrared or laser system. Such an additional system either acts redundantly in situations in which the passive system is subject to functional limitations. Alternatively, signals from at least one such additional system support the active detection of obstacles on the camera side, for example in the case of rear space monitoring.

The use of an additional active system proves advantageous, for example in the case of obstacles having a low structure, in which autofocus control of a video camera via fuzzy logic can also fail or, on its own, delivers too large a decision time delay.

Differing from conventional active ultrasonic or light measuring systems, at least one additional system of this type can therefore be primarily used here not for warning or giving alarms, but for influencing or supporting the capture and object following behavior of the electronic autofocus function of a video camera. By means of connecting the passive system to at least one of the above-mentioned active systems in a device, the respective weaknesses of the relevant individual systems are thus overcome in any case.

As a whole, the present invention clears essential obstacles which previously stood in the way of the use of video cameras, especially in the rear space monitoring of private cars. It is self-evident, that the possibilities of use of the device according to the invention are not limited to the rear space of a vehicle; a corresponding device can nonetheless also be provided and used for monitoring the front space of a vehicle.

Other objects, advantages and novel features of the present invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic side view of the system of the present invention which is provided in a vehicle, as well as two examples of relevant obstacles in the case of rearward parking;

FIG. 2 is a schematic top view of the system, including at least one active system and corresponding sensors, built into a vehicle, as well as two examples of relevant obstacles in the case of rearward parking; and

FIGS. 3a, 3b illustrate two schematic representations of two situation displays displayed to the vehicle driver on a display screen during reversing, these displays correspond to a larger distance "a" and a smaller distance "b" of the bumper from the nearest obstacle.

DETAILED DESCRIPTION OF THE DRAWINGS

According to FIG. 1, the system according to the invention includes, for example, a video camera 11 built into the rear 12 of a vehicle 10. The following description is given by way of example for a rear space viewing system, and it is readily understood that a similar system could be used at the front of the vehicle. The camera 11 is fitted with an autofocus measuring system and is connected via a connecting lead 14 to a viewing and monitoring device 15 located in a visual range of the vehicle driver. In this case, the camera 11 can be pivoted (that is to say tilted and turned) under electronic control, by means not shown in the figure, through the angle δ shown in the top view according to FIG. 2. The viewing and monitoring device 15 has a screen 15.1 for the driver-side display of the current camera image or field of view.

Also shown is the bumper 13 and, moreover, a distant obstacle 16 or 16' designated by "F" and a near obstacle designated by "N". The near obstacle "N" is identified by 17 in the condition A of an even larger distance "a" from the rear end or bumper 13 of the vehicle 10 and identified by 17' in the condition B of a smaller distance "b" from the rear end or bumper 13 of the vehicle 10. The identifications 16 and 16' correspond, in a similar manner, to the two conditions A and B. Furthermore, the bounding beams 20.A and 20.B of the respective viewing angle α of the camera 11 in the two (stationary) conditions A and B are shown.

FIG. 2 shows the configuration according to FIG. 1 in a top view. Proceeding from the elements known from FIG. 1, the image angle α , the scan angle β , the pivoting angle $\delta = \{\beta - \alpha\}$, and additional sensors 21.1 and 21.2 in the two end regions of the bumper 13 of at least one active ultrasonic or light-based measuring system are also shown here. The signal processing or signal evaluation of the system can be accommodated in a special module 22, in which the electronics necessary for driving the pivoting device on the camera side can also be accommodated. Such a module 22 can be connected directly to the camera or to the viewing and monitoring device 15 or can also be connected to both by means of a connection with the lead 14. Also apparent here are the bounding beams 20.A and 20.B of the respective viewing angles of the camera 11 in the two (stationary) conditions A and B.

In FIG. 3a, an auxiliary frame 18 with, for example, field or quadrant division 18.1 can be seen on the screen 15.1. Furthermore, the objects 16 and 17 are displayed, as seen by the camera in the condition A, that is to say in the case of an even greater distance "a" of the bumper 13 from the near object 17.

In this case, therefore, both objects 16 and 17 are still within the image angle of the camera 11 symbolized by the bounding beams 20.A. Moreover, the object 17 situated closer is within the current sharpness measuring field 19, and is therefore the image content part currently controlling the image sharpness and, in this respect, dragging the measuring field 19 with it. It is shown that, in the condition A, the

camera 11 essentially still detects the whole rear space and thus all obstacles with which the vehicle could collide.

The display on the screen 15.1 according to FIG. 3b corresponds to the condition B in the case of an already considerably reduced distance "b" of the bumper 13 from the object situated closer, which is here identified by 17' corresponding to FIGS. 1 and 2. In this case, the field of view corresponds to the image field angle between the bounding beams 20.B in FIGS. 1 and 2.

While the object 17' is therefore still in the dragged measuring field 19 in the central region 15.Z of the screen 15.1, the distant object 16—not dominant in the central region 15.Z even in the condition A, that is to say even at a greater distance "a"—has disappeared from the original field or quadrant 18.1, over the auxiliary frame 18 and the edge region 15.R of the screen, from the field of view of the camera 11 (already intermediately pivoted). As a result of the pivoting of the camera 11—instead of the distant object 16, a portion of the rear contour of the vehicle, specifically the bumper 13, is moved into the field of view (FIG. 3b).

By means of the insight which has thus become possible of the ever decreasing distance b, the vehicle can thus be driven accurately to within centimeters, for example, until the bumper 13 makes contact with the near object 17'. It is understandable that, in so doing, the image angle of the camera does not have to be significantly altered, so that no complicated, long or expensive lens is necessary.

Not further shown in the figure is an image processing unit which can be realized in any arbitrary manner, and which can be accommodated or implemented either completely in the camera 11, completely in the viewing and monitoring device 15, distributed over the camera 11 and the viewing and monitoring device 15, or else accommodated or implemented mainly inside the measuring unit 22.

It is only essential for the invention that the image processing unit, as a component of the device, is capable of detecting a movement of the object-referenced sharpness measuring field 19 in the image plane and to evaluate it into at least one pivoting signal which when fed as a drive signal to the means for pivoting the camera—effects a pivoting of the camera in such a manner that the sharpness measuring field 19 optionally does not leave an original detection quadrant, reaches and fills at least one predetermined detection quadrant and/or—as far as possible—does not wander from the central region of the image field over the auxiliary frame 18 out into the edge region of the image field, that is to say out of the viewing angle of the camera.

The image-processing-supported cooperation of the camera 11 with the viewing and monitoring device 15 optionally also as a function of signals which are emitted by additional distance-detecting sensors 21.1 and 21.2 on at least one additional sonic or light-based measuring system 22, as described further below, is as follows.

Upon reaching a critical distance to an obstacle, the image processing unit seeks the nearest obstacle 17 for a further approach. In this respect, the "critical" distance is determined by means of a scan cycle while pivoting the camera through the pivoting angle $\delta = \{\beta - \alpha\}$ [where β = scan angle, α = image angle], initially in the complete detection range of the camera (image field+pivot). Once detected, the autofocus measuring system of the camera 11 adjusts its optics to the corresponding nearest obstacle 17.

From this point in time, the near obstacle 17 is dominant, that is to say, the autofocus control of the camera, in conjunction with the above-mentioned image processing unit, effects the dragging along of the sharpness measuring

field 19 which is incident on the dominant object, independently of further relative movements between camera 11 and near obstacle 17. The image processing unit thus ensures as a whole, not only that the sharpness range corresponding to the distance or movement of the vehicle relative to the near obstacle 17, 17' in its spatial depth is displaced with reference to a contour identified once in the measuring field 19, but also that the camera is additionally pivoted in such a manner that the sharpness measuring field 19, independently of its possibly also wandering position on the screen, cannot disappear out over its edge, and also inasmuch as the obstacle of interest cannot disappear from the field of view of the vehicle driver.

During this dragging process, the correspondingly changing distance "a", "b" between the bumper 13 and the near obstacle 17, 17' can be continuously measured by suitable means and can be overlaid on the screen 15.1. For this purpose, sound and/or light measuring means, separate, or as additional means already mentioned as included in the system, are suitable.

For high measuring accuracy and a comfortable imaging size of obstacles occurring in practice and an ability to easily judge the displayed distance relations, a camera lens not having too short of a focal length has proved to be expedient. Because the image angle achievable with one such lens is not sufficient, for example also to include in the image the entire vehicle rear from a base position of the camera 11, the image processing unit ensures that if, in the case of further approach, the near object 17' wanders to the image field edge and threatens to disappear from the displayed field of view, the camera is re-pivoted in such a manner that the near object can leave the reproduced field of view of the camera only because the field of view is limited by the rear or front contour of the vehicle.

The image displayed to the vehicle driver on the screen 15.1 therefore finally shows the obstacle at the absolutely smallest possible distance "b" measured in the longitudinal direction of the vehicle, always in relation to the vehicle contour appearing somewhere on the edge of the screen, as shown, for example in FIG. 3b in relation to the bumper 13.

If, for example, during a rearward approach of the vehicle 10, the obstacle 16 or 17 should move out of the field of view of the camera 11 (specifically, past the vehicle towards the front), it is detected as not collision-dangerous, and the image processing unit searches for the next obstacle to be considered by means of a new scan process.

However, although an obstacle present is detected as critical and followed, it can occur that, in the meantime, an even nearer and even more relevant obstacle appears. The more relevant obstacle would then not be detectable because of a lack of sharp imaging capability (outside the measuring field 19 dragged by the obstacle already present).

In order to prevent this from occurring, the scan process mentioned above is repeated at minimum time intervals, specifically at such a rate that the vehicle driver is not disturbed during driving up to the obstacle. In this case, it is only essential that the vehicle driver is definitely presented with the important obstacle to him corresponding to the direction of driving of the vehicle.

Also lying within the scope of the present invention is that the system, instead of or additionally to means for triggering and effecting the said scan process, also includes another independent unit 22 for the detection of the respective nearest obstacle. In this case it can be, for example, a laser scanner with a moving beam or a system based on CCD image detection elements as sensors 21.1 and 21.2. In any

case, these can be connected at least to the viewing and monitoring device 15 on the driver's side, so that detection results of such additional scanning devices can also be displayed on the screen 15.1 of the viewing and monitoring device 15, for example also inserted into the continuous image transmission.

It is also within the scope of the invention that the additional devices are operatively connected to the image processing unit in such a way, and the latter is designed in such a way, that it can derive data about the relevant position of an obstacle in the image field of the detection space of the additional devices, and can transmit them, at least for the pivoting pre-adjustment of the video camera for the purpose of immediate centering of its sharpness measuring field, to the pivoting means of the camera, in order to thus achieve the most rapidly possible sharp imaging of the critical obstacle.

According to the present invention, such an additional module continuously monitors the whole space behind or in front of a correspondingly equipped vehicle, in order to thus continuously detect obstacles occurring. For this purpose, the additional module has means which, for the purpose of the pivoting adjustment of the camera 11 in the event of the (wide angle) detection of a relevant obstacle, can transmit its position within the total field of view of the independent detection unit to the viewing and monitoring device 15 or directly to the camera 11 or to the pivoting means connected to the latter. This is done so that the viewing angle of the camera 11 is thus always pre adjusted or drawn towards the most relevant obstacle.

Since, in the case of obstacles having only a low structure, the autofocus function is slowed down or fails completely, the system can alternatively also include an additional ultrasonic or infrared light measuring system, which permanently monitors the space behind or in front of the vehicle.

Such a system, as a component of the device, can in this case be operated both redundantly and also as a system cooperating with the camera 11 and the viewing and monitoring device 15, which achieves for the viewing and monitoring device is an analogous function of the selection of obstacles for the pre-positioning of the camera 11.

For the purpose of optimization of the focal length of the camera lens, it has proved to be expedient to provide a pivoting and tilting angle for the camera 11 of up to about 30° from the neutral position. At such a pivoting angle, the camera 11 or its lens can still be accommodated mostly within the contour of the vehicle 10, so that good protection can be realized without greater expenditure.

What is claimed is:

1. A system for monitoring a space in front of or in a rear of a motor vehicle which is being parked, the system comprising:

a video camera built into either the front or rear of the vehicle;

a viewing and monitoring device, having a display screen, operatively coupled to said video camera, said viewing and monitoring device being located so as to be in a field of view of a driver of said vehicle;

means for pivoting said video camera as a function of electric drive signals, said video camera having object-referenced image sharpness control of its optics, said sharpness control being effective over a whole image angle detected by said video camera such that a corresponding sharpness measuring field is able to follow an object over the entire display screen once it is detected; an image processing unit which subdivides an image picked up by said video camera into at least one of

fields, quadrants, and an edge region arranged outside and a central region arranged inside an auxiliary frame as reference fields for discriminating the object subjected to said sharpness control across the display screen, said image processing unit discerning an instantaneous position of said sharpness measuring field with reference to said at least one of the fields, quadrants and edge and central regions of the auxiliary frame;

said image processing unit generating said electric drive signals for said pivoting means to pivot the video camera such that the sharpness measuring field at least one of does not leave an original field or quadrant, reaches a predetermined field or predetermined quadrants, and does not cross from the central region over the auxiliary frame into the edge region of the image field, so as to one of counteract, neutralize and eliminate a sampling pivoting of the video camera from being triggered.

2. A system according to claim 1, wherein said object-referenced image sharpness control is carried out using fuzzy logic.

3. A system according to claim 1, wherein said image processing unit is designed such that at least one of: before the detection of a nearest obstacle and after the loss of detection of a sharpness dominant near obstacle, at least one sampling pivoting of the camera is triggered, fully covering a pivoting angle δ of the video camera in order to detect a most complete field of view (β) possible.

4. A system according to claim 3, wherein said image processing unit is further designed such that, during a sequence of following a sharpness-dominant near obstacle, said image processing unit undertakes a corresponding cyclical scan sequence at high speed, for detecting newly occurring obstacles.

5. A system according to claim 4, further comprising means for electronically storing a last respective image, and in that the image picked up during a cyclic pivoting scan sequence of the video camera is blanked out and can be displayed on the screen together with an added warning marker instead of the last image displayed and stored before the scan sequence, and in that an immediate insertion of a

screen image from the cyclic scan sequence currently in the process of being carried out takes place when the image processing unit recognizes, in so doing, a near obstacle more critical than that already currently in the process of being followed.

6. A system according to claim 1, further comprising at least one of additional active sound-based and light-based means and sensors cooperating with said system for the detection of the respective nearest obstacle.

7. A system according to claim 6, wherein said additional means are connected at least to said viewing and monitoring device on a driver's side, and in that detection results of said additional means can be displayed on the displaying screen of said viewing and monitoring device.

8. A system according to claim 6, wherein said additional means are operationally connected to said image processing unit, said image processing unit being designed such that it can derive data for a relevant obstacle via its relative position in the image field of a detection space of the additional means, and can transmit the data, at least for a pivoting preadjustment of the video camera for the purpose of immediate centering of its sharpness measuring field, to the pivoting means of the video camera.

9. A system according to claim 1, further comprising laser scanning means for detecting a respective nearest obstacle using a moving beam.

10. A system according to claim 9, wherein said laser scanning means are connected at least to said viewing and monitoring device on the driver's side, and in that detection results of the laser scanning means can likewise be displayed on the display screen of said viewing and monitoring device.

11. A system according to claim 1, further comprising means for allowing the distance of the vehicle from the currently nearest obstacle to be measured and co-indicated on the display screen during a continuous detection and display of a distance situation to the currently nearest obstacle.

12. A system according to claim 11, wherein at least one of sound and light measuring means are used.

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